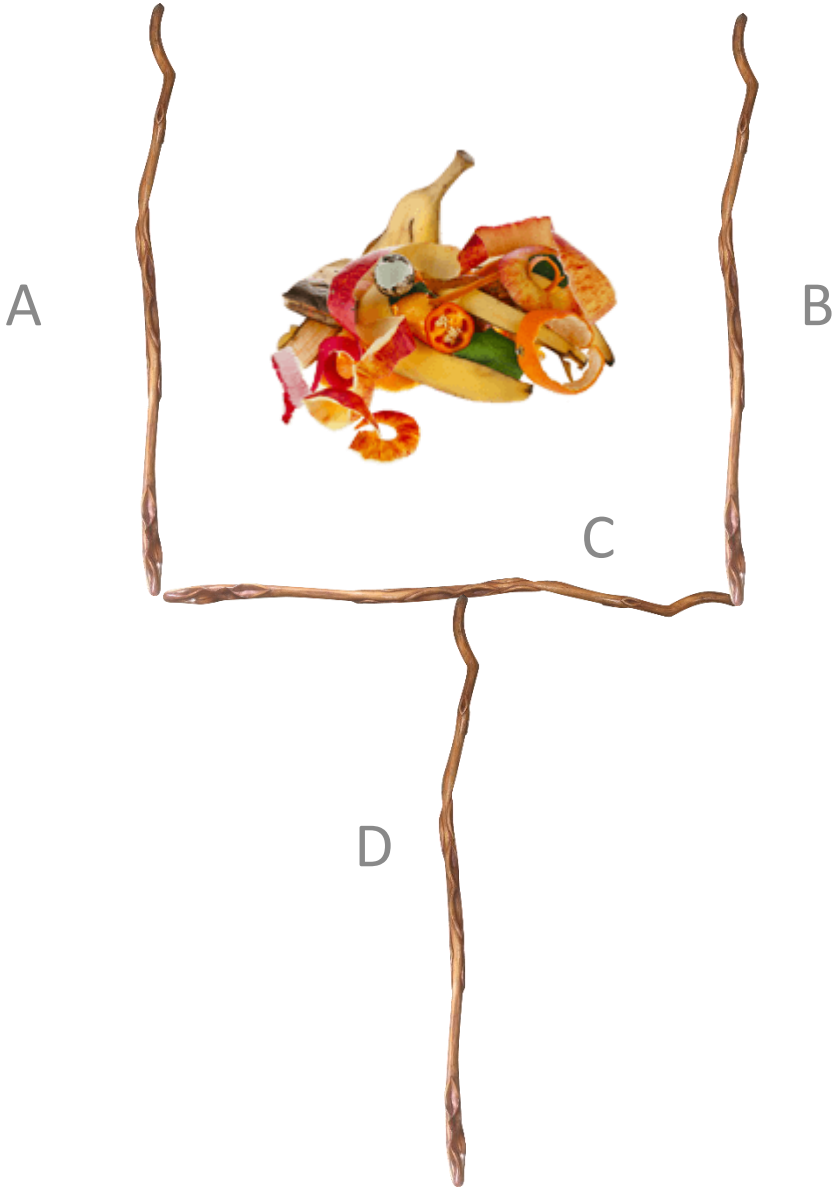
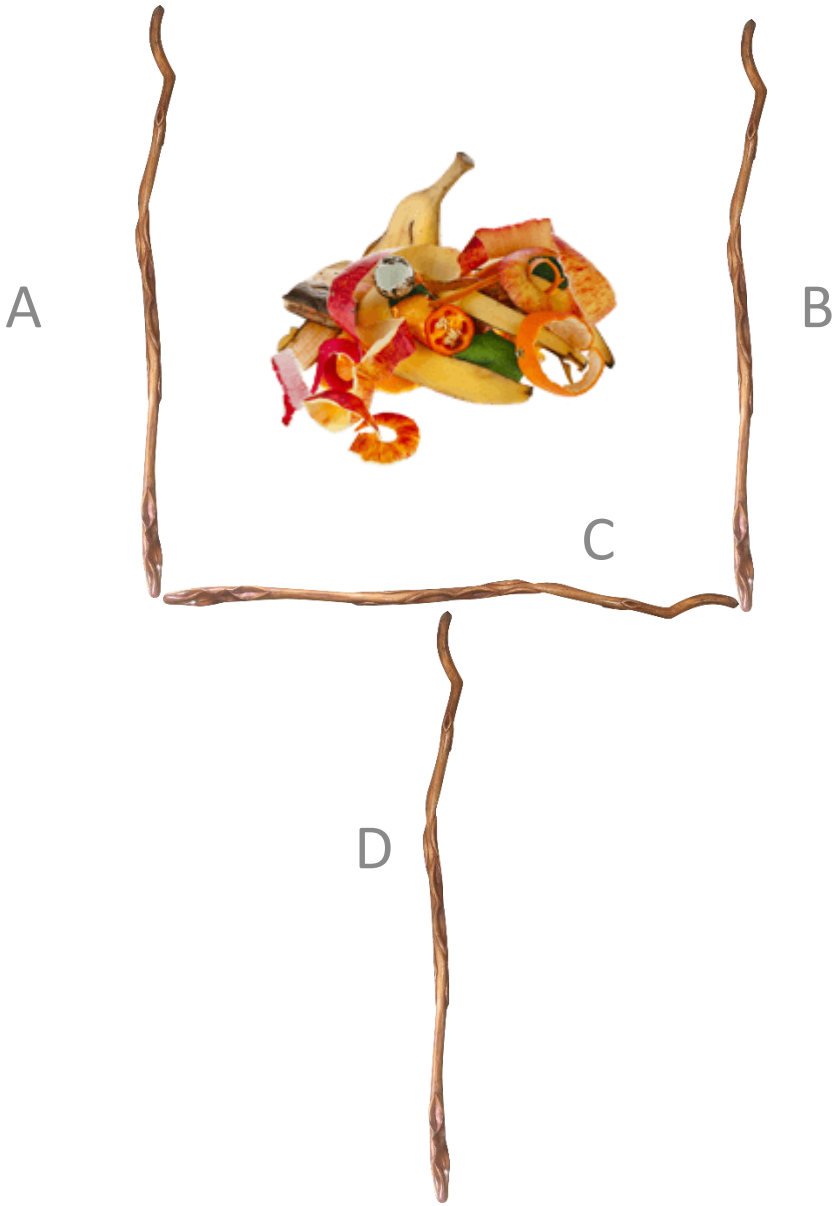
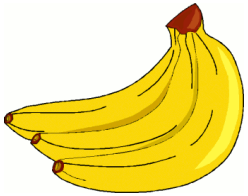
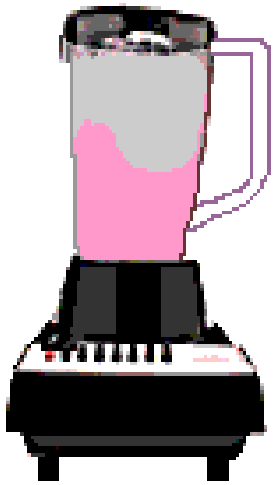
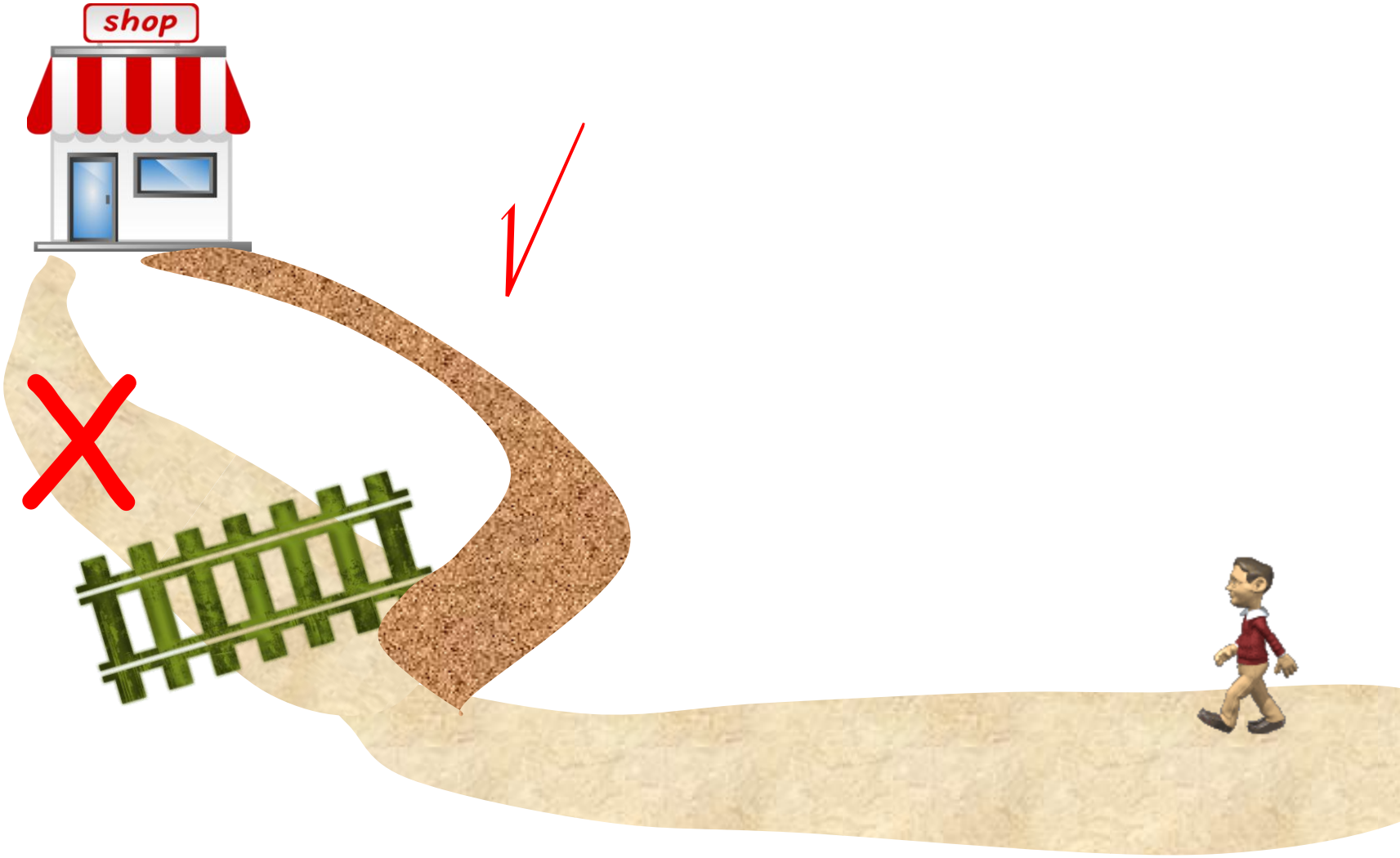

A
B
C
D


A
B
C
D





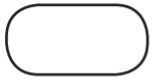
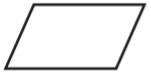
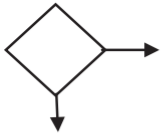
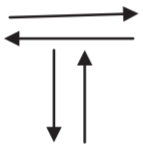

shop

What is an Algorithm?

- An algorithm is a method to show the steps in solving a problem.
- An algorithm is a step-by-step procedure for solving a problem

Representing an Algorithm

Flowcharts

Symbol	Function
	Start or end
	Input or output
	Process
	Decision
	Flow direction
	Connector

Pseudo Codes

BEGIN - To indicate a beginning

END - To indicate an end

INPUT , READ , GET - To indicate an input

OUTPUT, DISPLAY , SHOW - To show an output

PROCESS, CALCULATE - To indicate a process

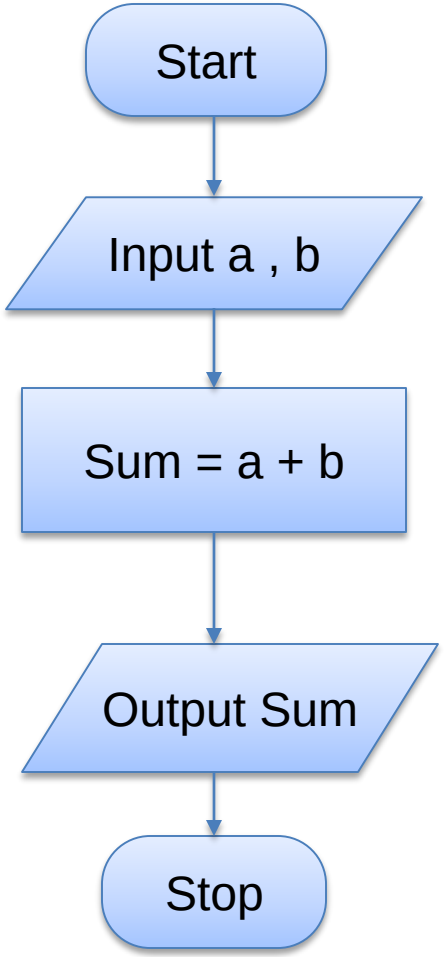
IF … THEN .. .ELSE … ENDIF - Used to indicate a selection

FOR – DO
WHILE – ENDWHILE
REPEAT - UNTIL

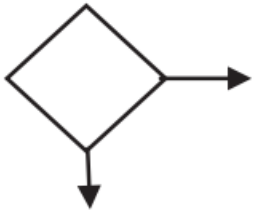
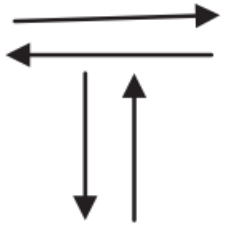
} Used to indicate a repetition

Flow Charts

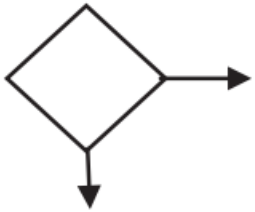
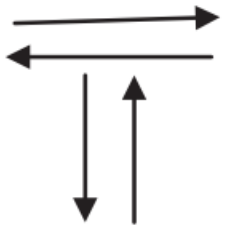
- It is a step by step Diagrammatic representation of the program

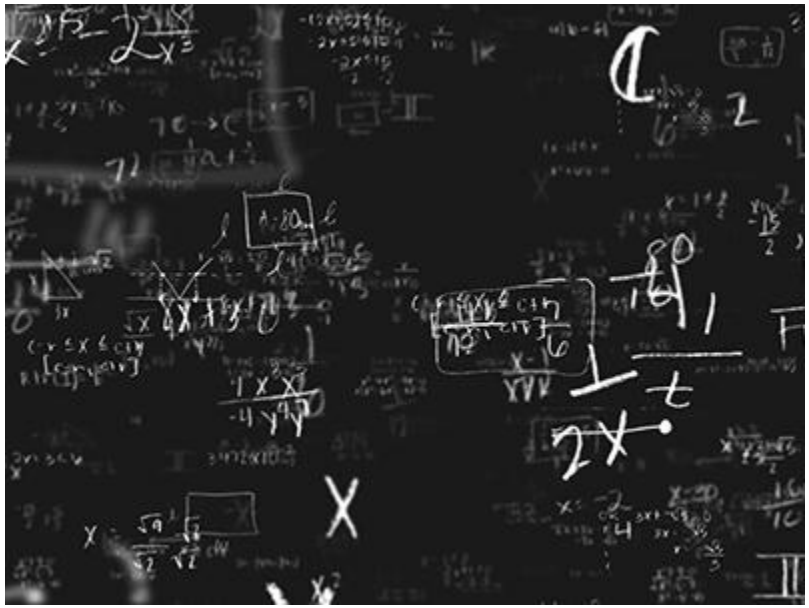


Each type of task is represented by a symbol

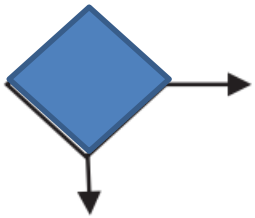
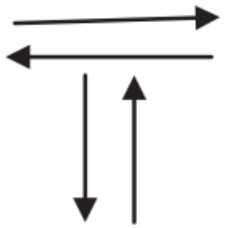
Symbol	Function
	Start or end
	Input or output
	Process
	Decision
	Flow direction
	Connector

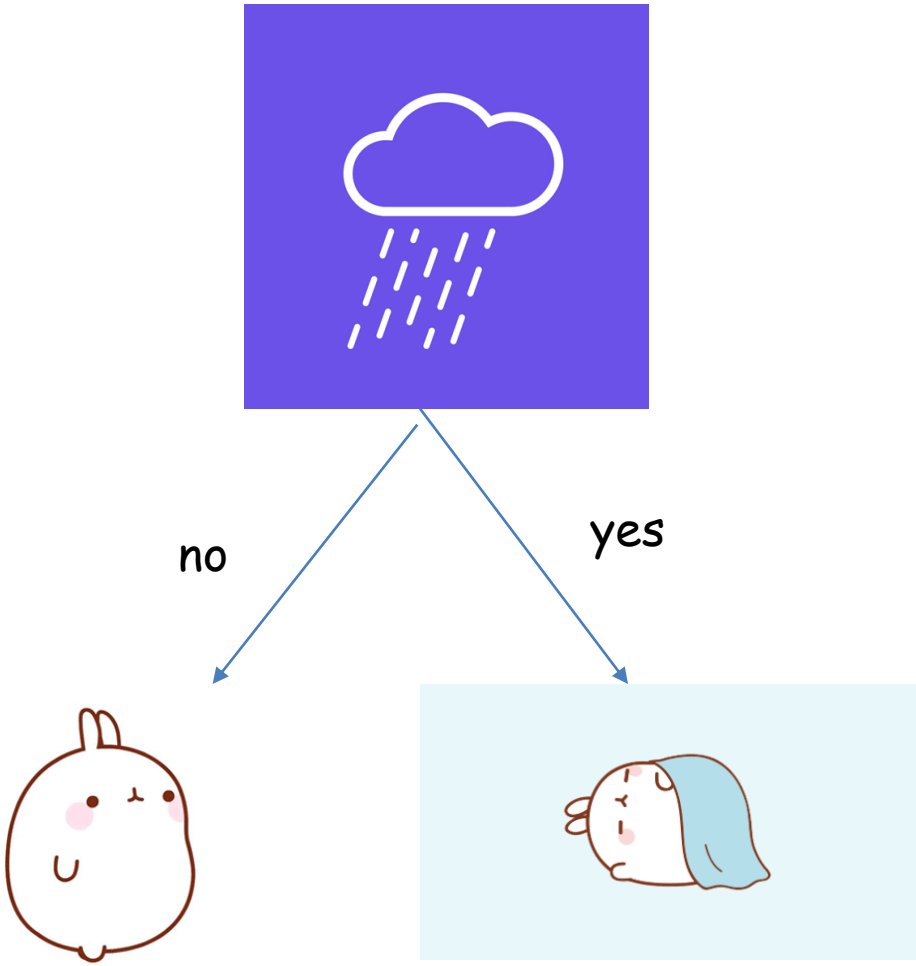
Each type of task is represented by a symbol

Symbol	Function
	Start or end
	Input or output
	Process
	Decision
	Flow direction
	Connector



Each type of task is represented by a symbol

Symbol	Function
	Start or end
	Input or output
	Process
	Decision
	Flow direction
	Connector



pseudo code

- When an algorithm is presented in simple English terms it is called a pseudo code.
- Pseudo codes are independent of a computer language.

```
Begin
    Input No 1, No2
    Total = No 1+No2
    Print Total
end
```

BEGIN - To indicate a beginning

END - To indicate an end

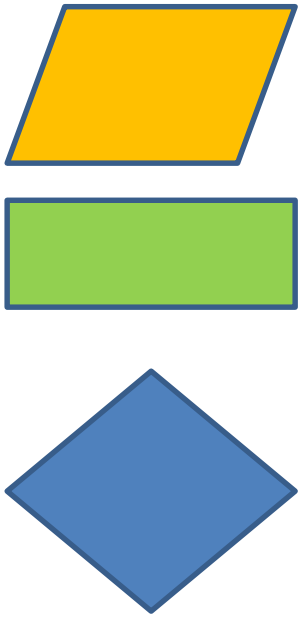
INPUT , READ , GET - To indicate an input

OUTPUT, DISPLAY , SHOW - To show an output

PROCESS, CALCULATE - To indicate a process

IF … THEN .. .ELSE … ENDIF - Used to indicate a selection

FOR – DO
WHILE – ENDWHILE } Used to indicate a repetition
REPEAT - UNTIL



The logic constructs

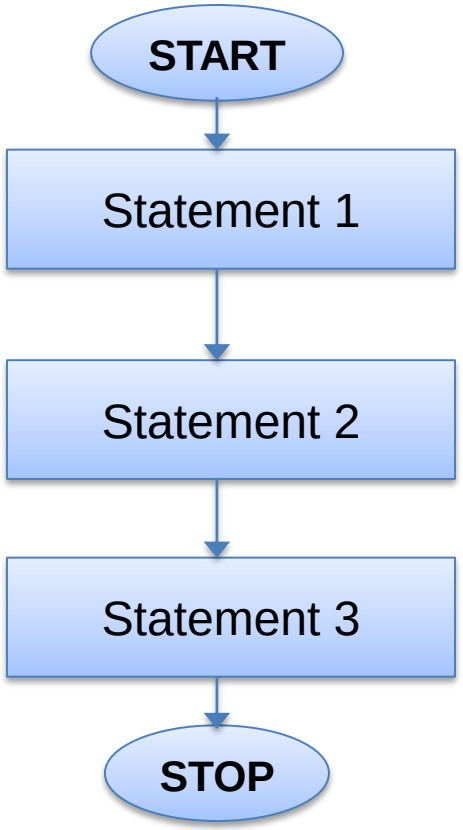
- **Sequence**
- **Selection**
- **Iteration**

Activity

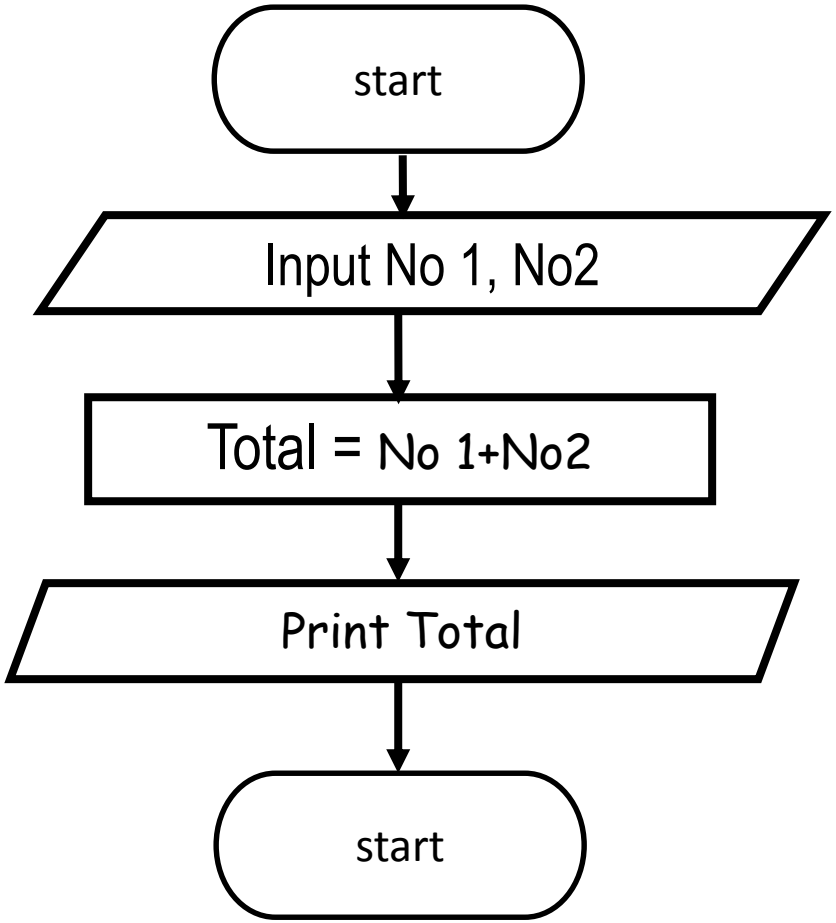
how to make fruit salad

SEQUENCE

- **SEQUENCE** is a linear progression where one task is performed sequentially after another.

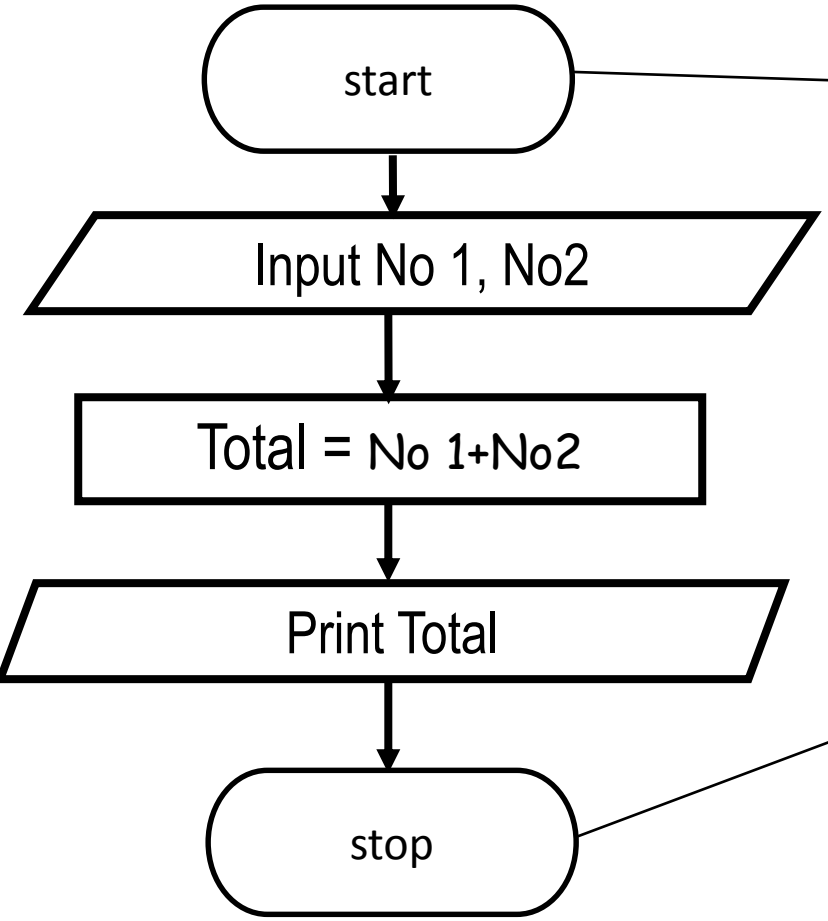


(Sequence)



Add two numbers and display total

Add two numbers and display total



Begin

Input No 1, No2

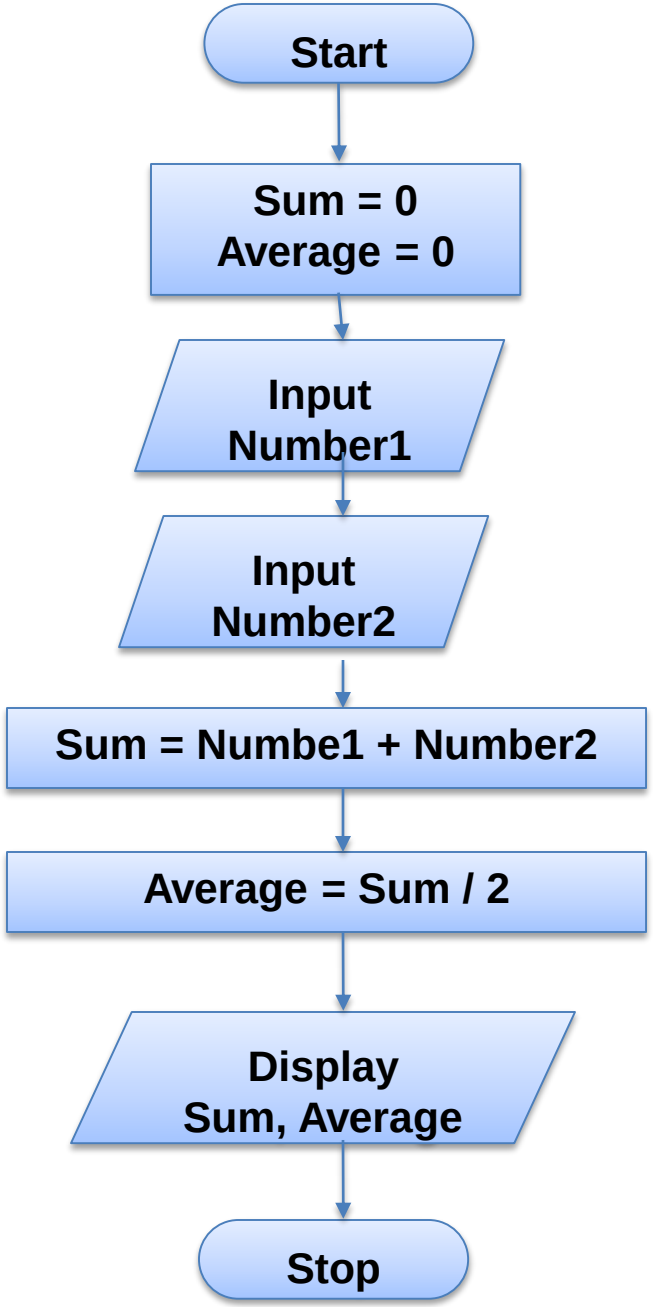
Total = No 1+No2

Print Total

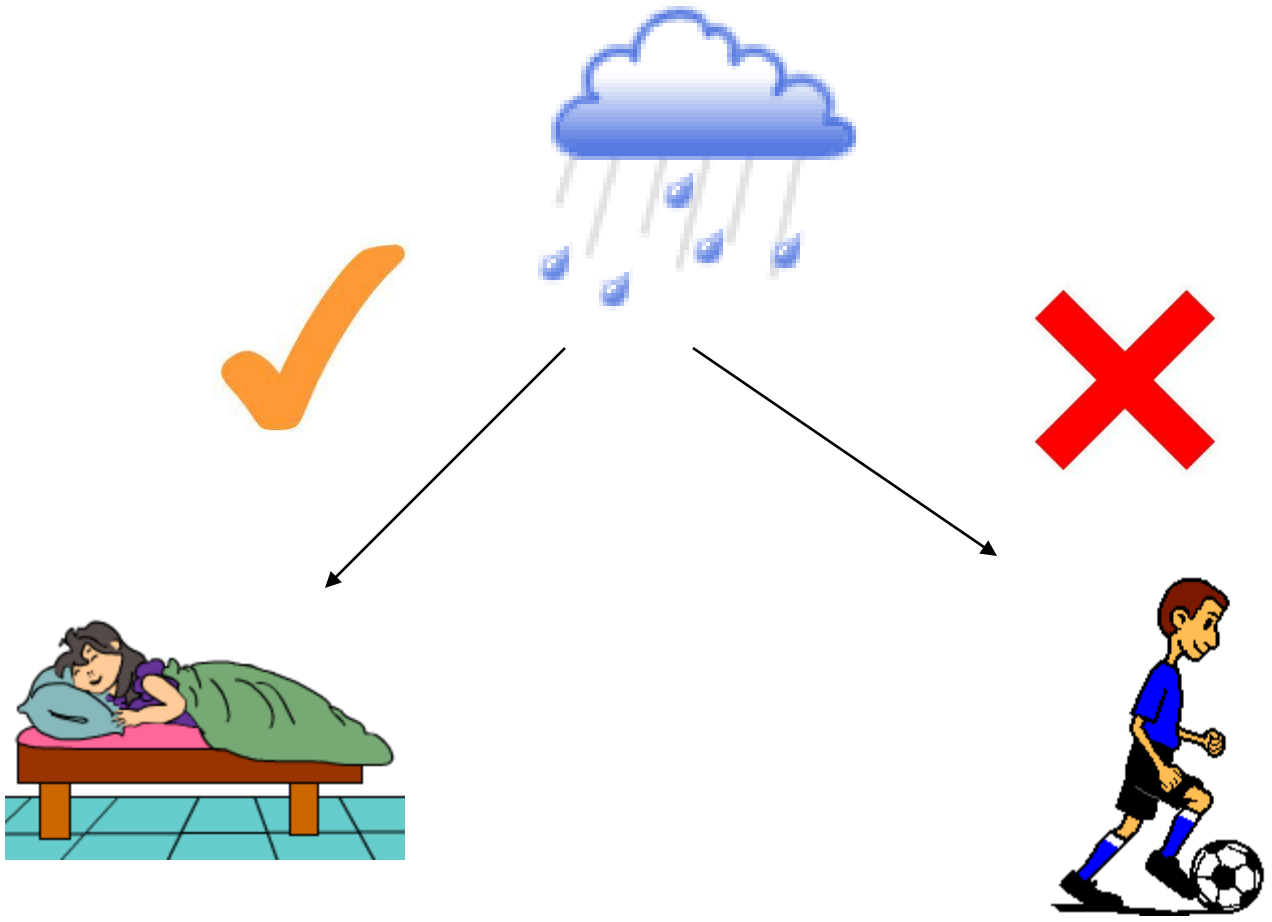
end

Example-1

Find the sum and average of two numbers



if

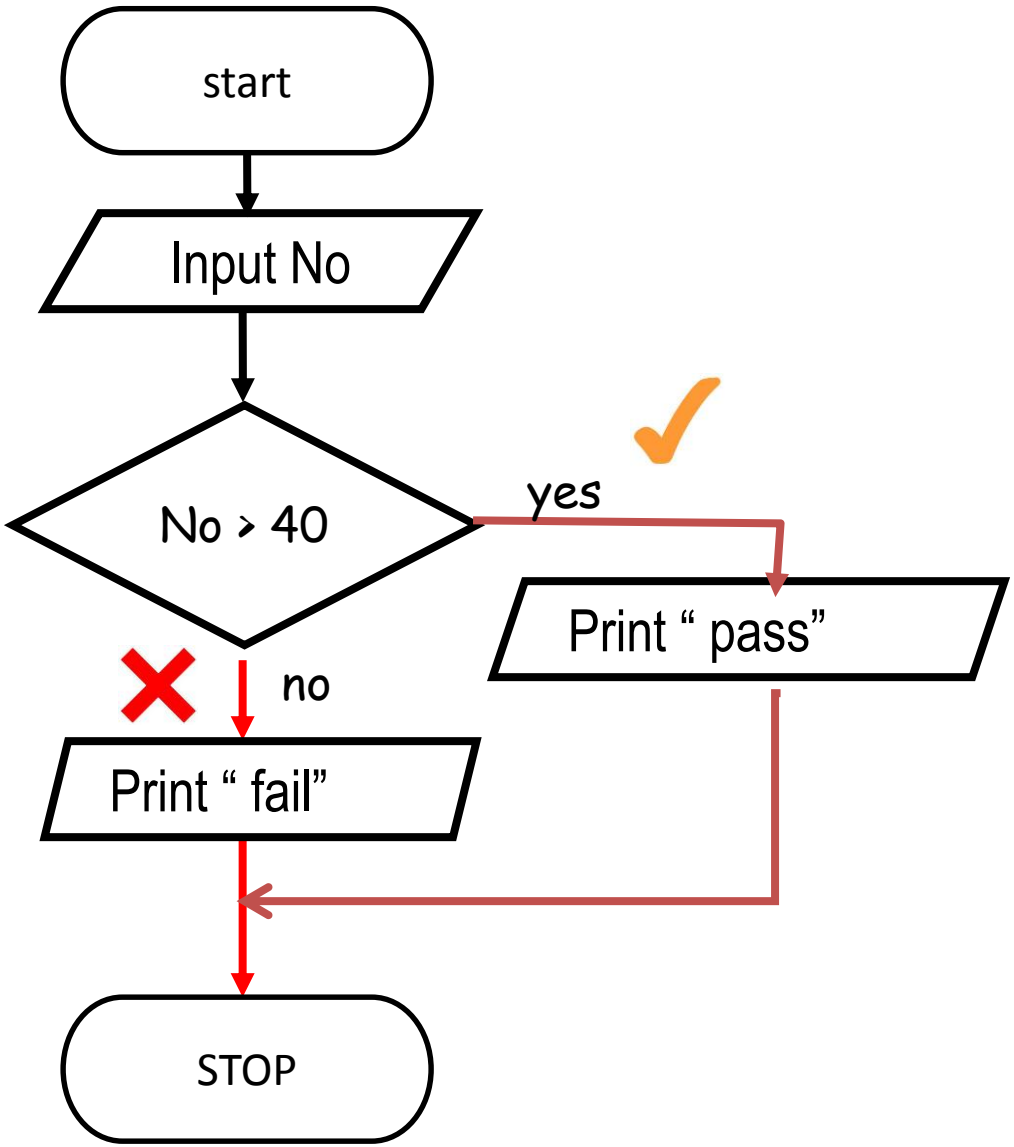


SELECTION

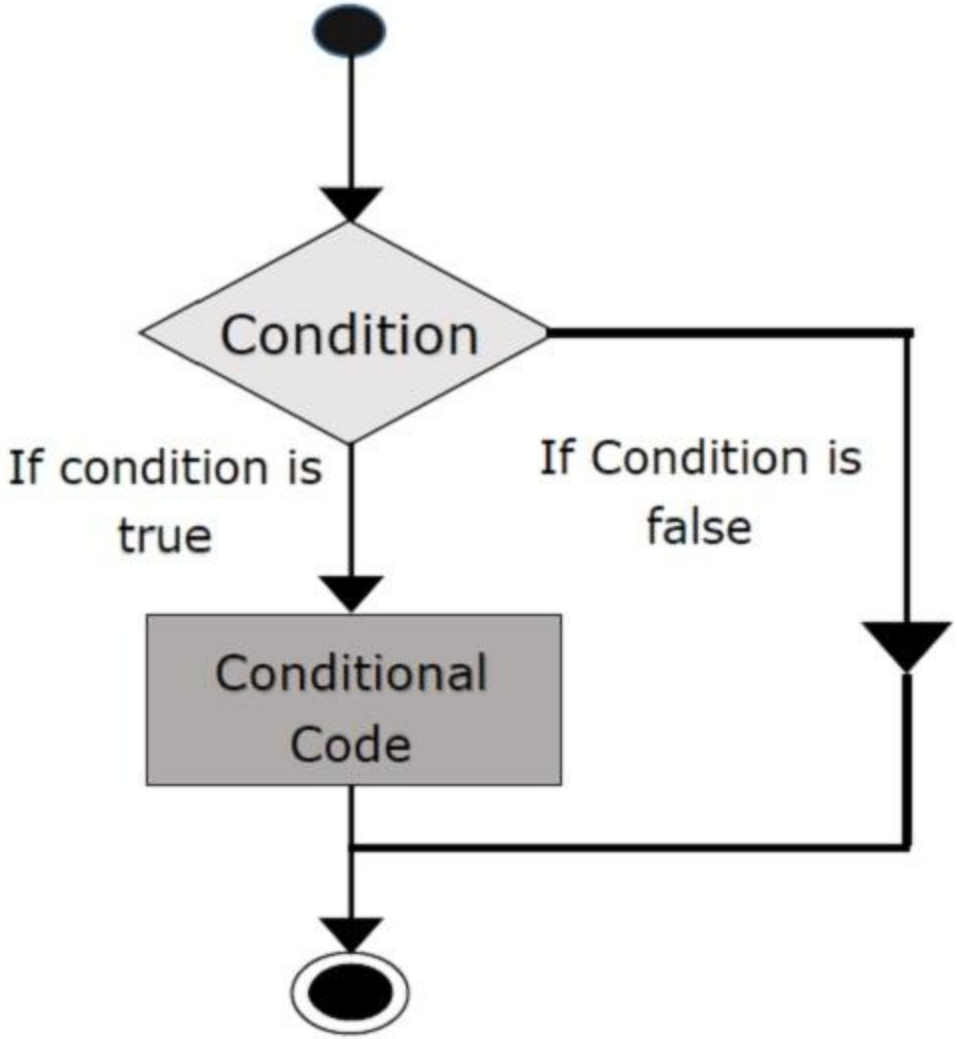
SELECTION - there may be alternative steps that could be taken subject to a particular condition

IF-THEN-ELSE END IF is a decision (selection) in which a choice is made between two alternative courses of action

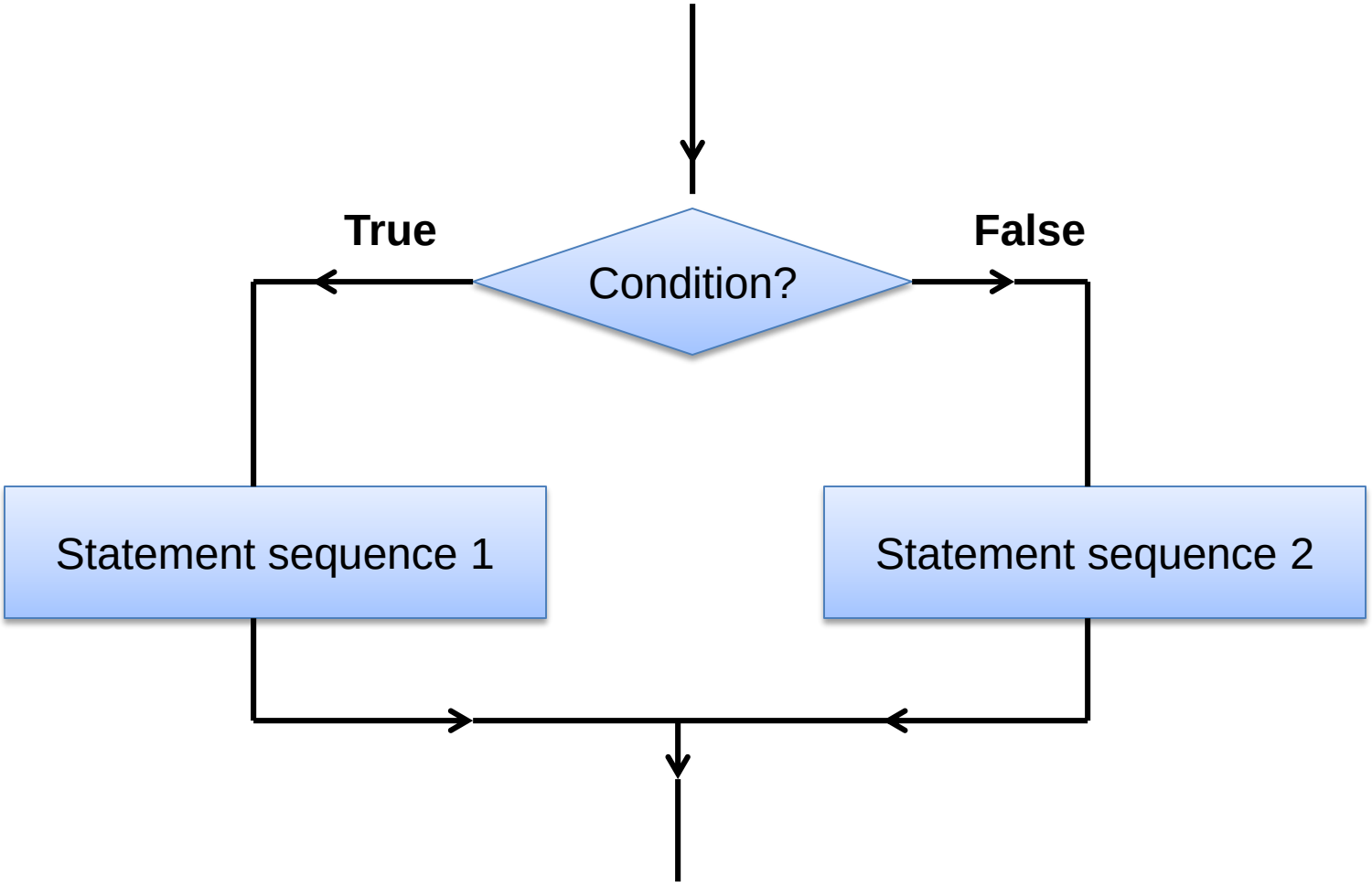
(Selection) (if then, if then else, case)




```
Begin
  Input No
    if No >40 then
      print "pass"
    else
      Print "fail"
    end if
End
```

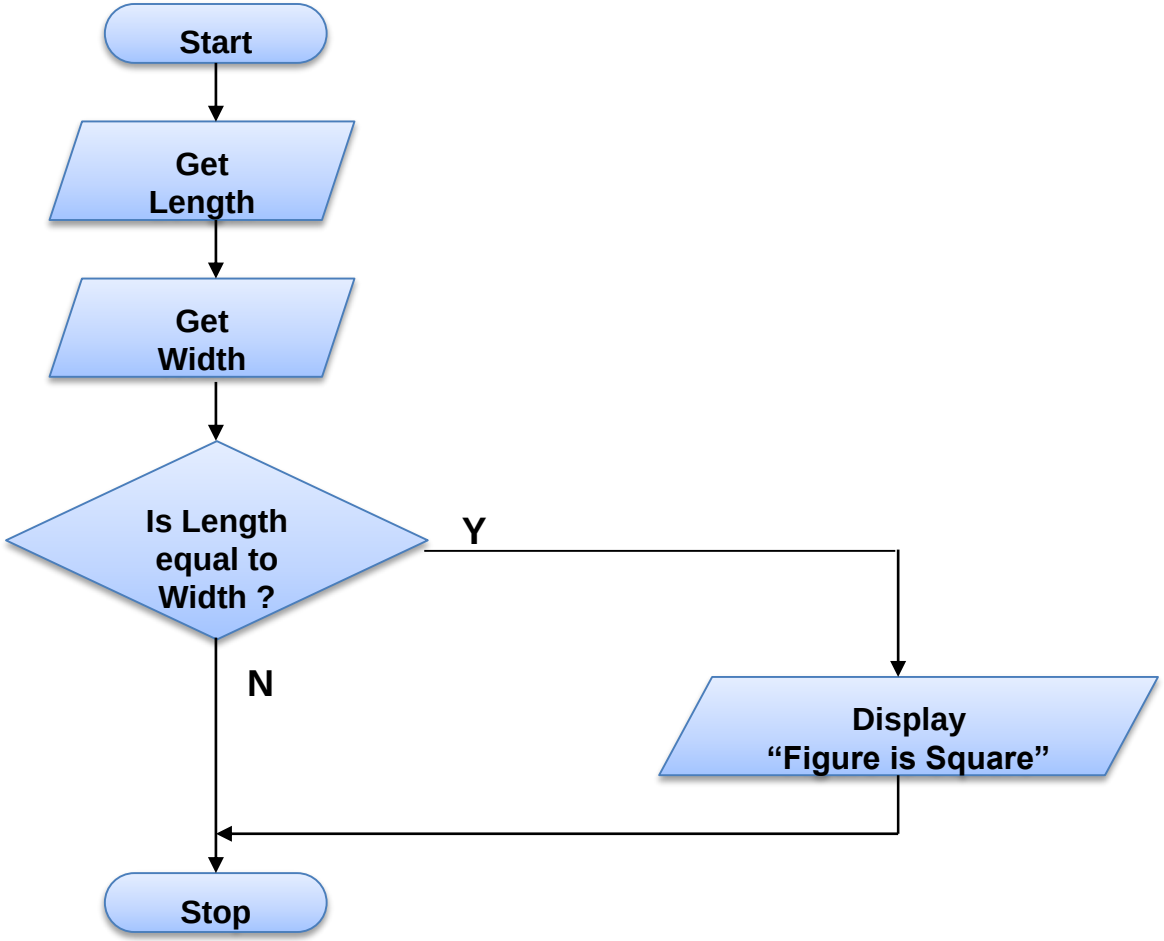

Condition
If condition is true
If Condition is false
Conditional Code

SELECTION– flow chart



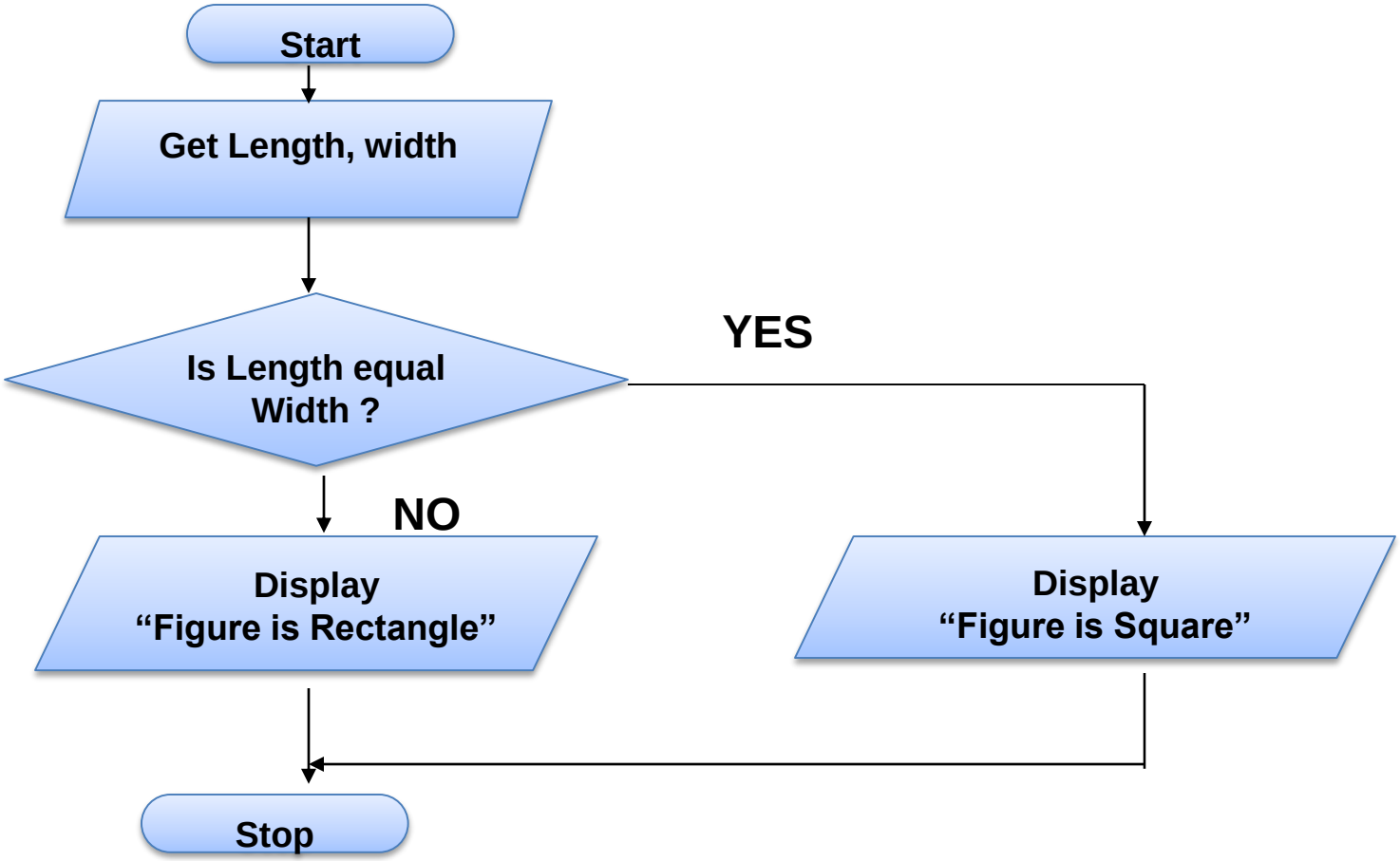
Example-2

- Input the length and width of a quadrilateral and state whether it is a square

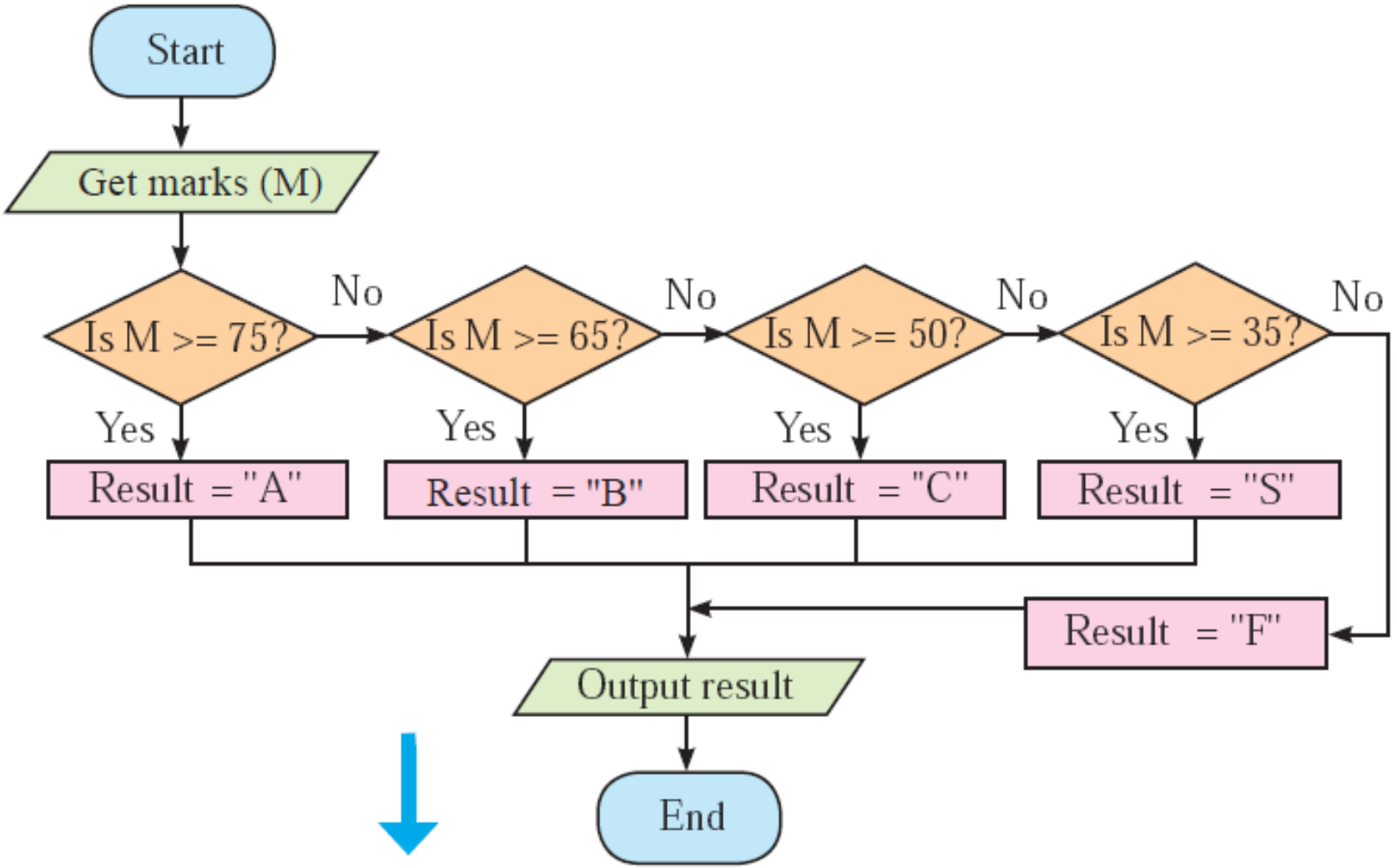


Example-3

Input the length and width of a quadrilateral and state whether it is a square or a rectangle.



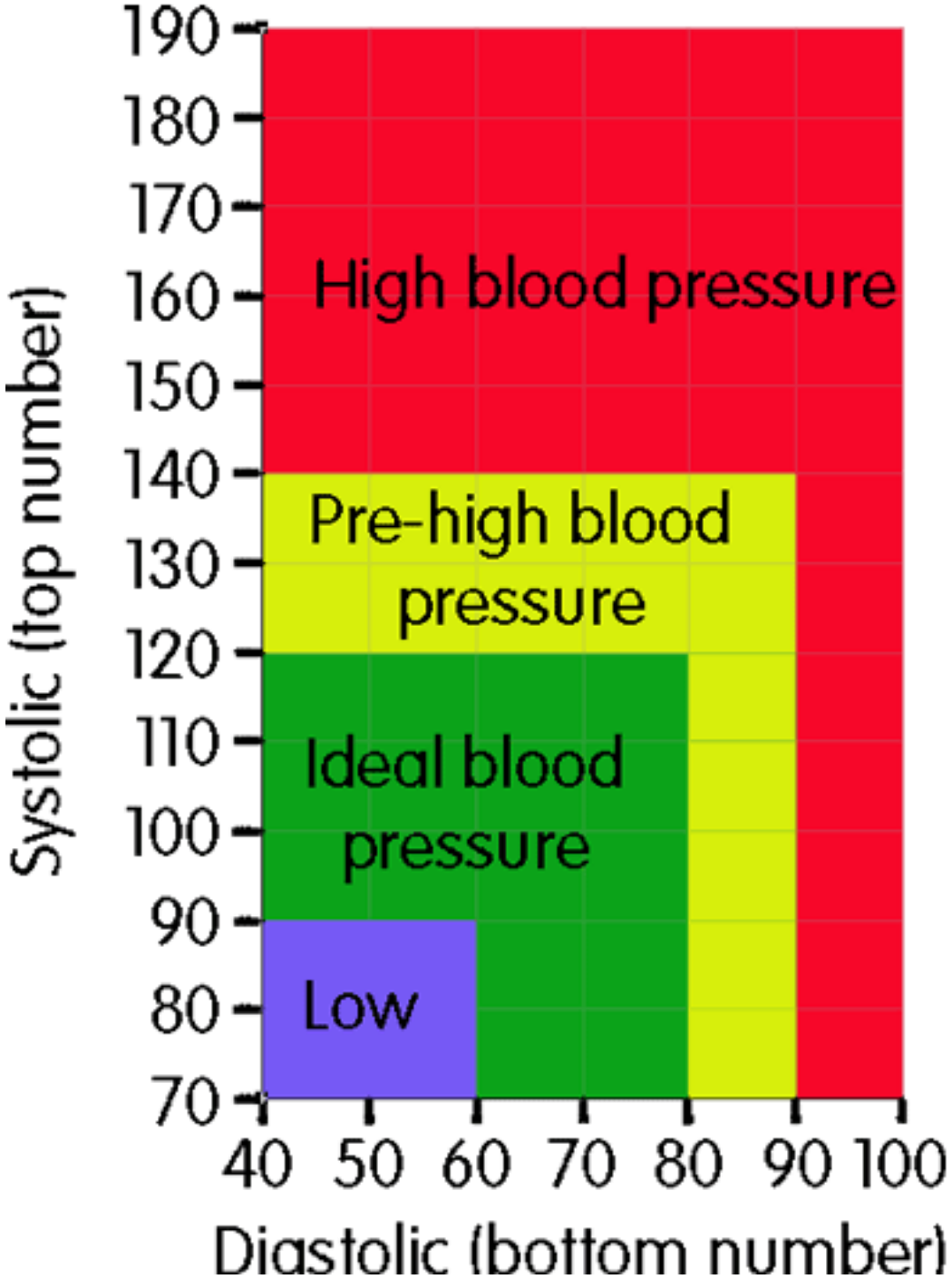
E.g. 3 - Finding the Grade when the marks scored by a student for a subject is given as input.



Flow chart

$$BMI = \frac{HXH}{W}$$

BODY MASS INDEX (BMI)	
CLASSIFICATION	**BMI SCORE (kg/m2)**
Underweight	**< 18.5**
Normal	**18.5 - 24.9**
Overweight	More than 25.0


Systolic (top number)
190
180
170
160
150
140
130
120
110
100
90
80
70
High blood pressure
Pre-high blood pressure
Ideal blood pressure
Low
40 50 60 70 80 90 100
Diastolic (bottom number)

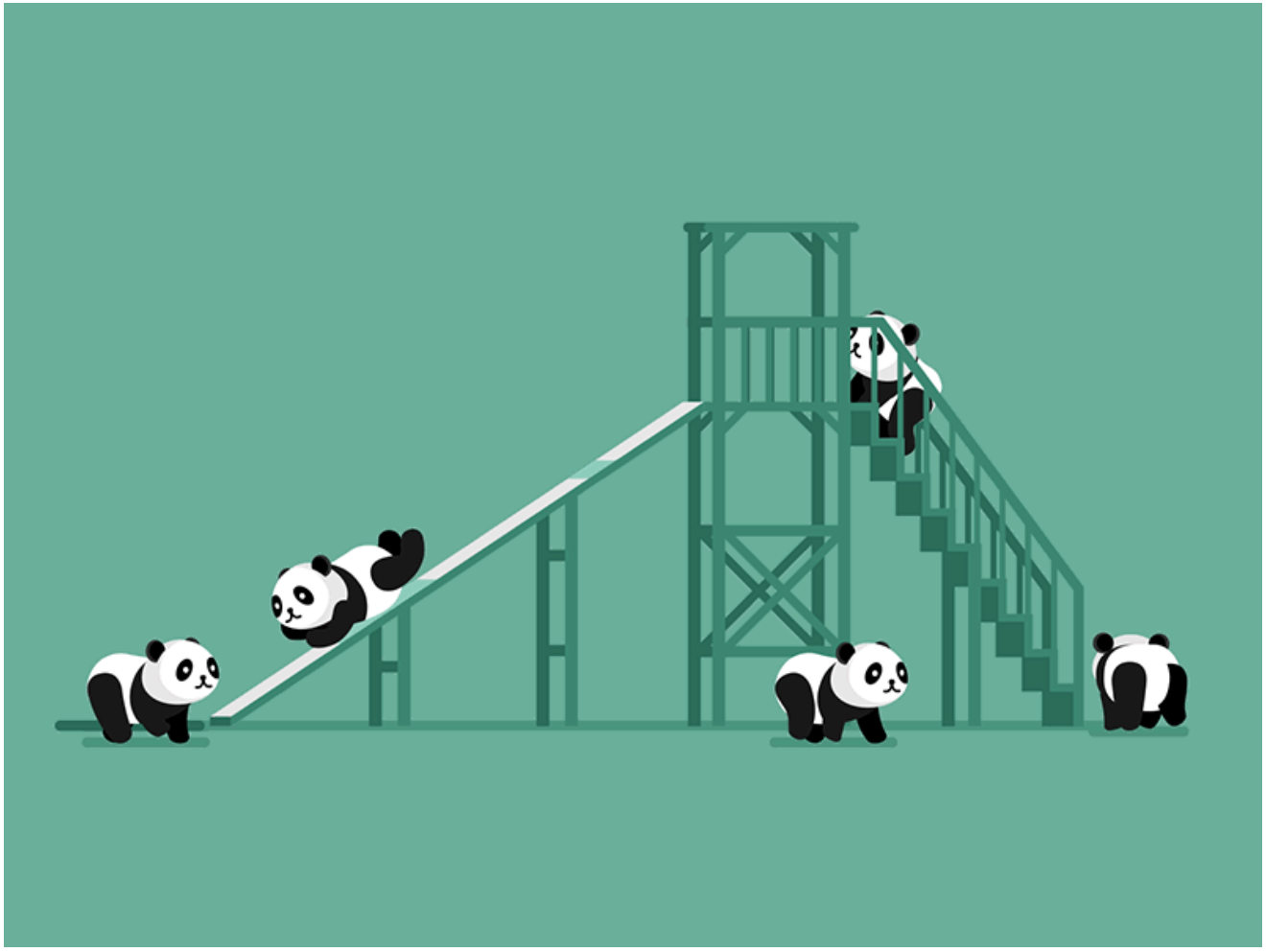
Cross the road

1 2 3 4 5

5

Looping

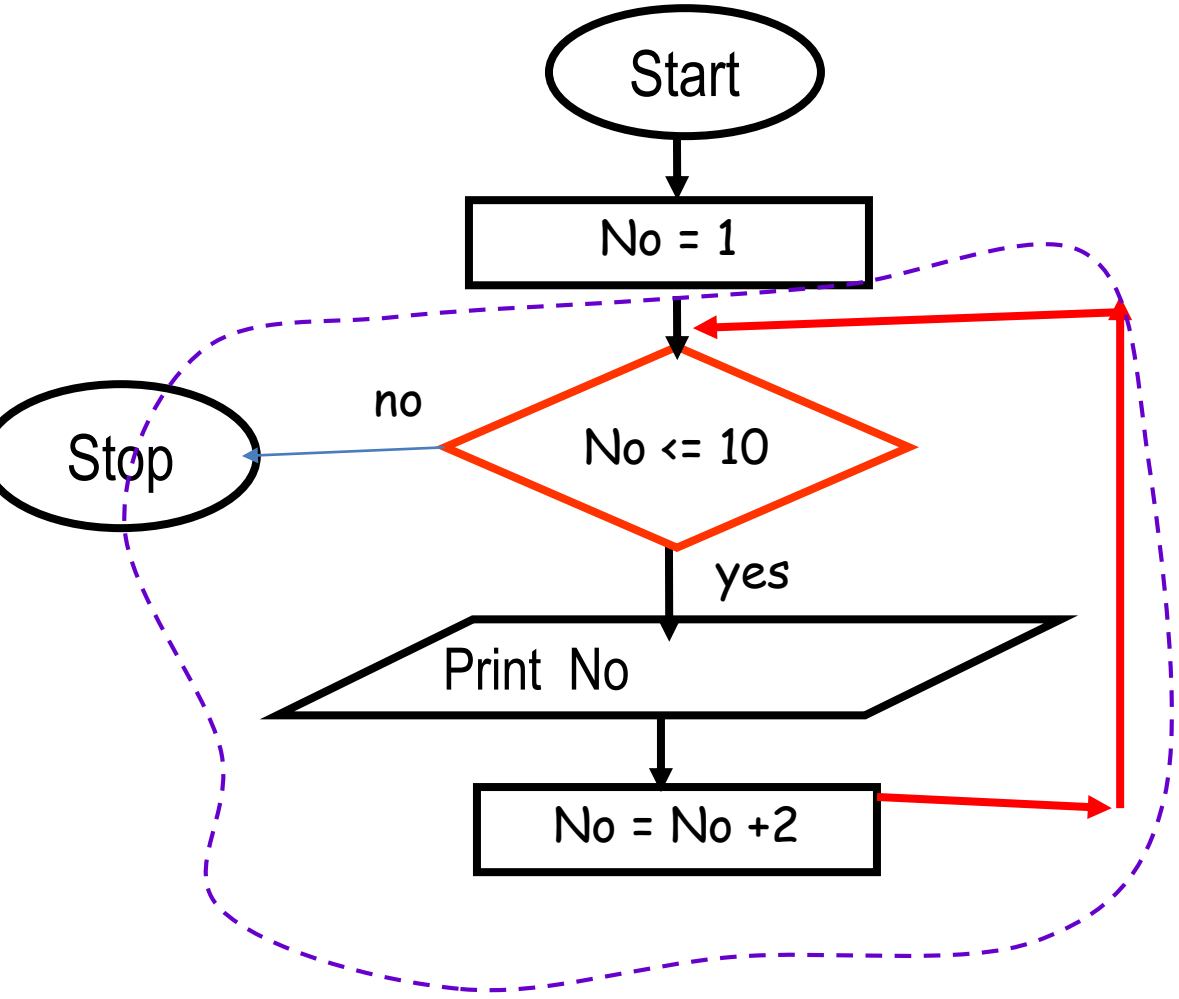
(Repititions) (for, while, repeat)



ITERATION

- **ITERATION** - certain steps may need to be repeated while, or until, a certain condition is true
- While
- For
- Repeat

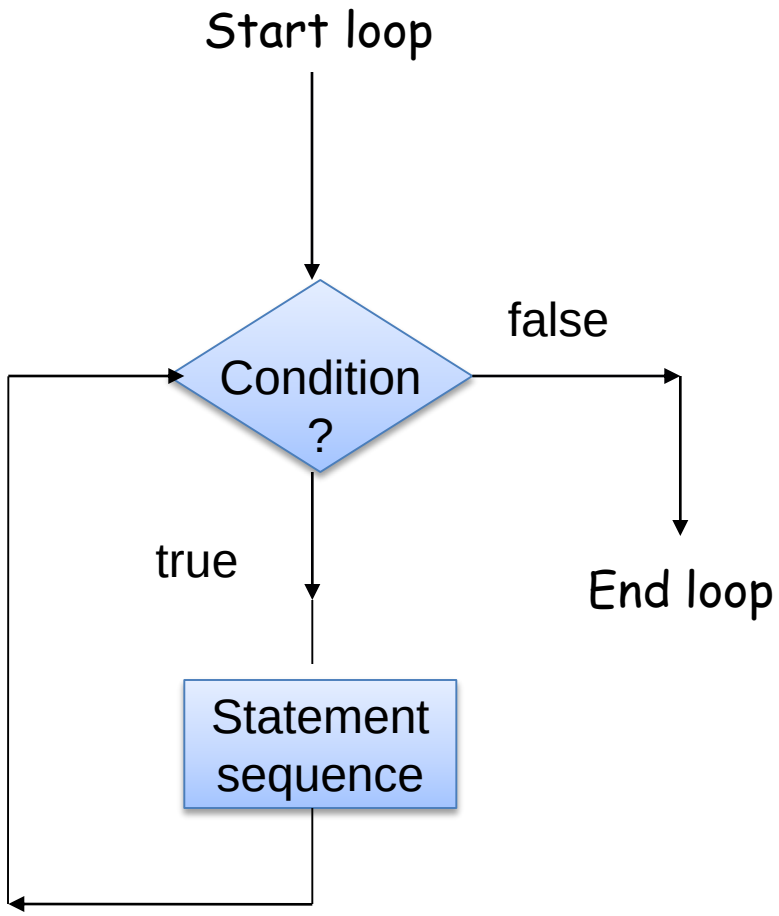
Loop

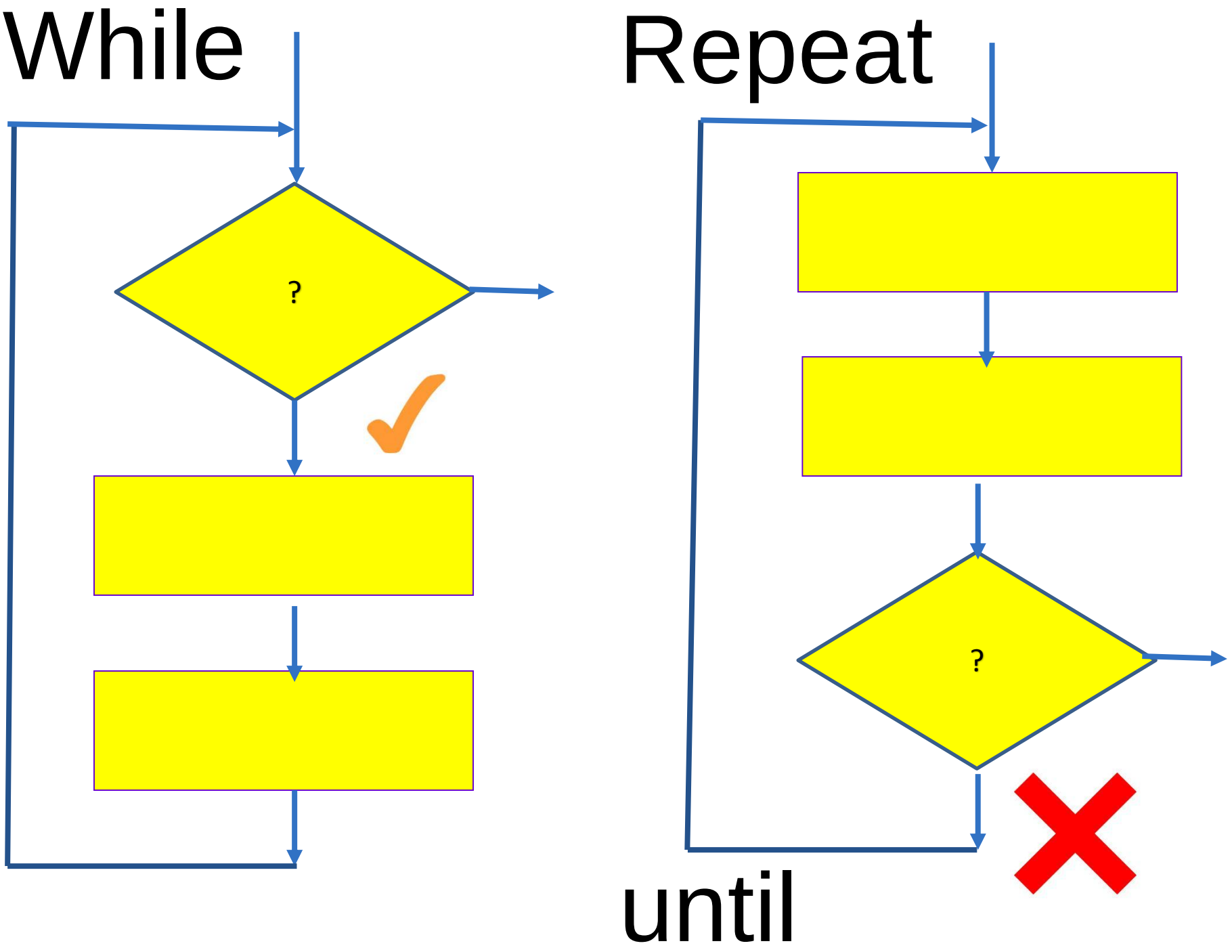



```
Begin
  No=1
 while No <= 10
        Print No
        No = No + 2
End while
End
```

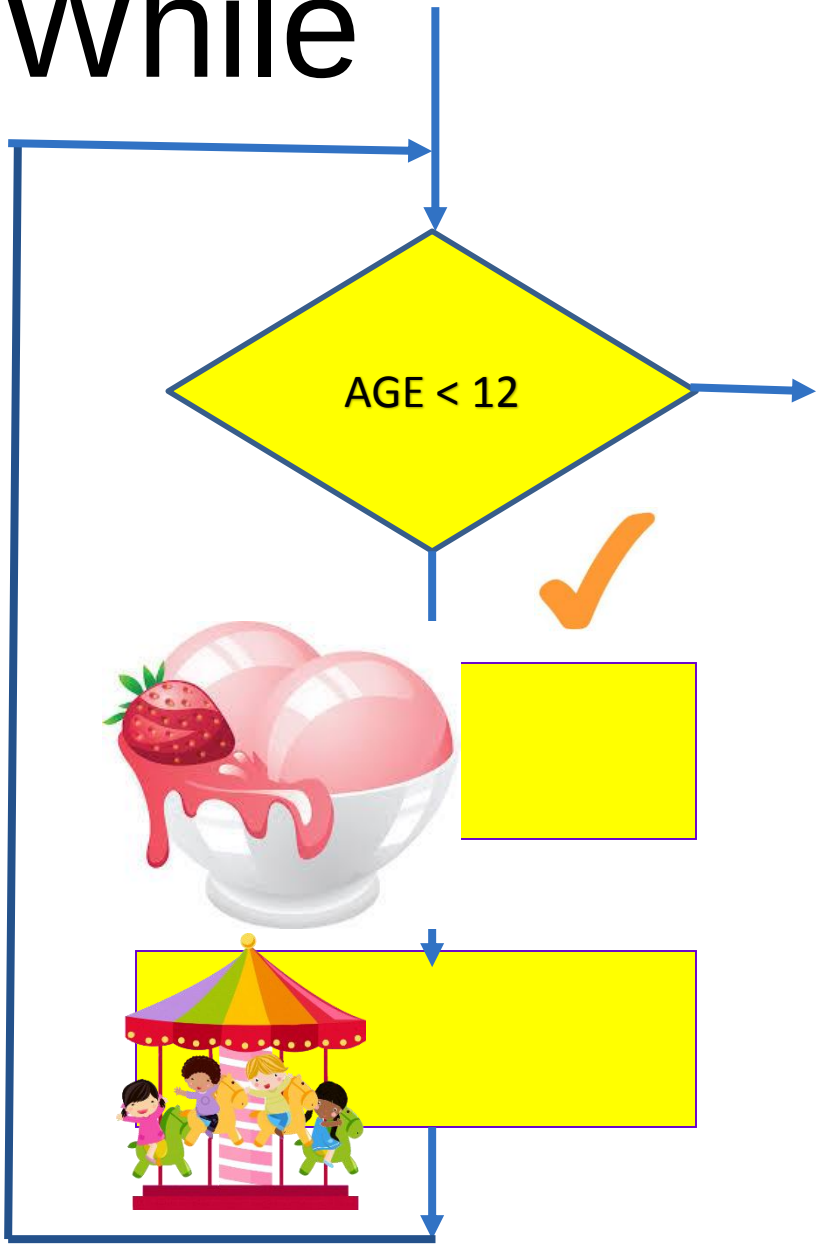
No
1
3
5
7
9
11

while

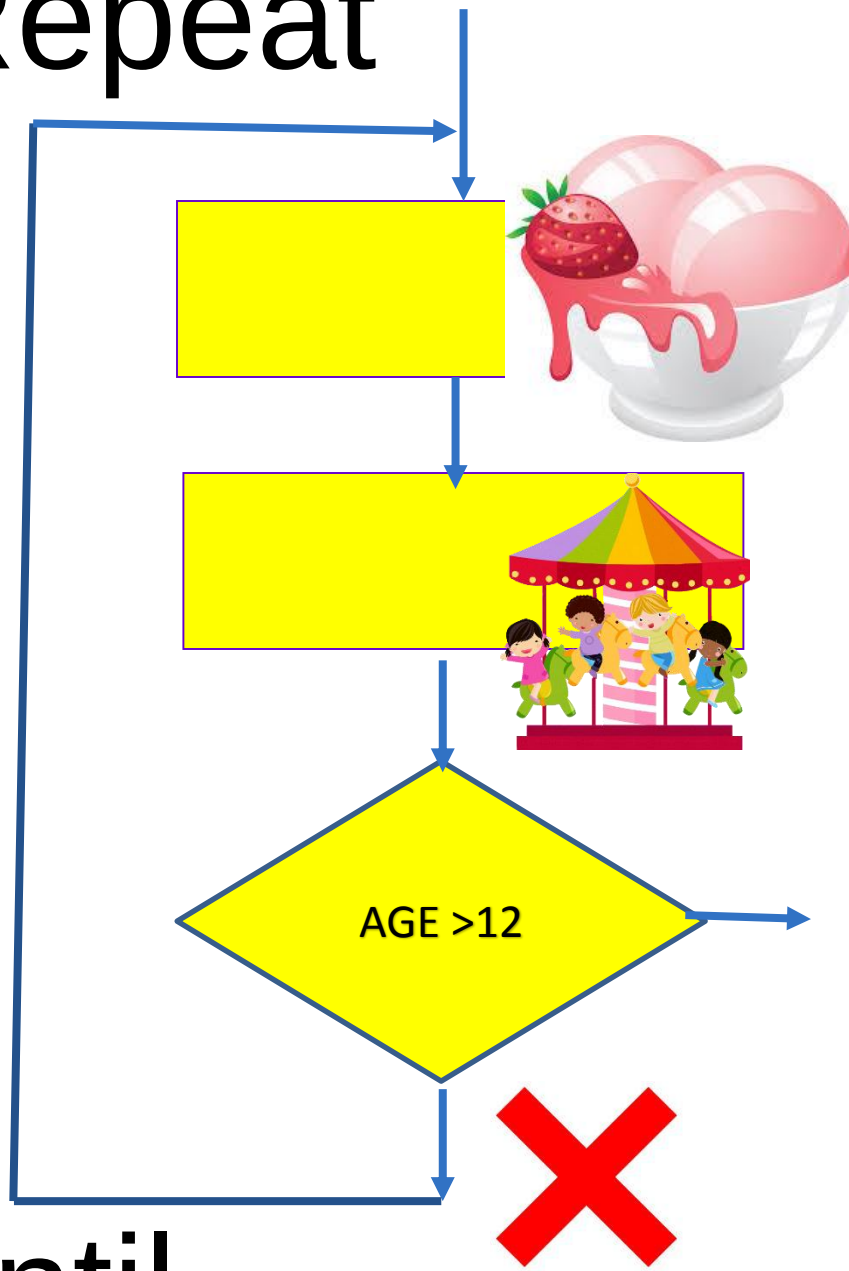

Start loop
Condition ?
false
true
End loop
Statement sequence


While
?
Repeat
?
until

While

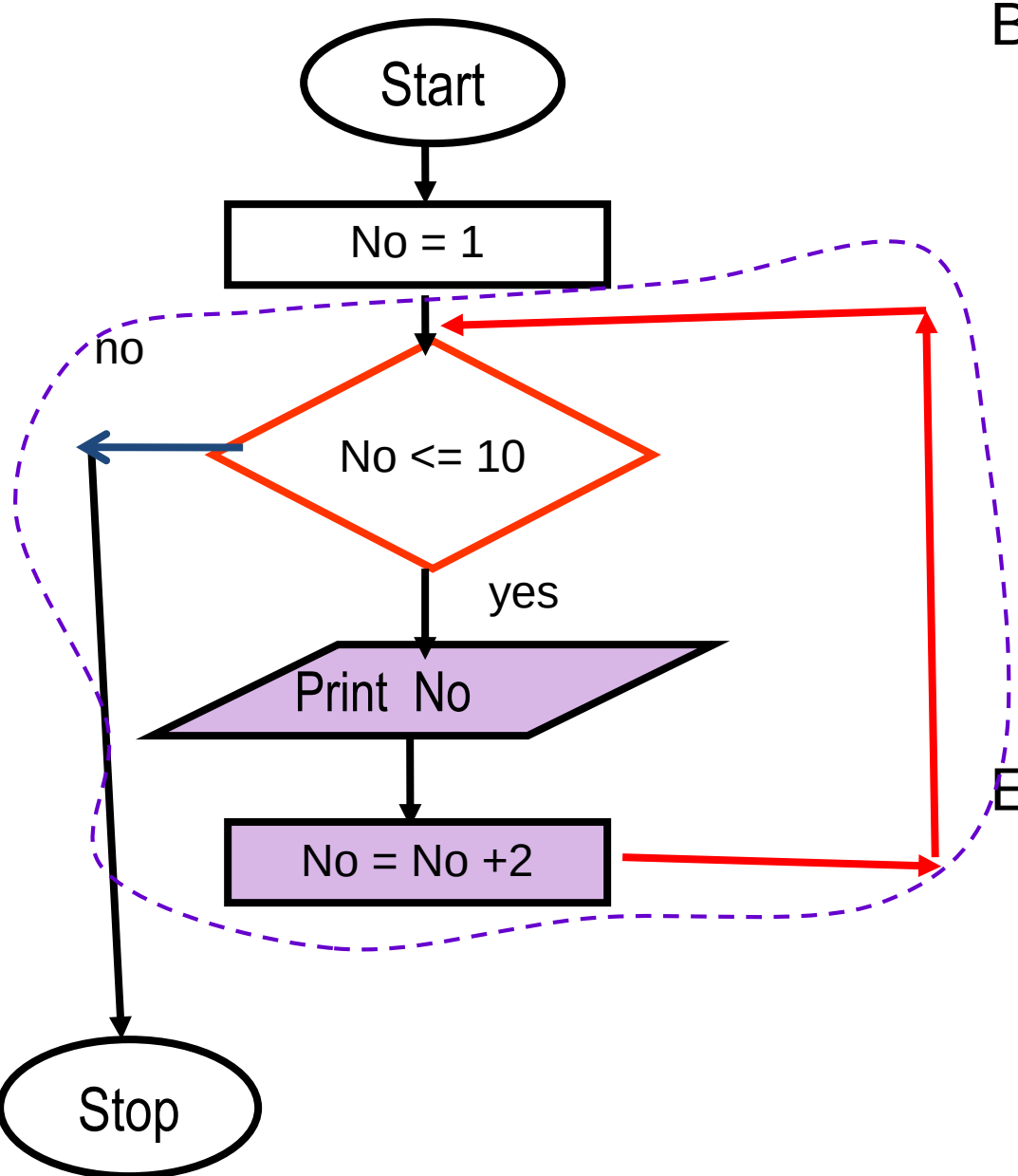


Repeat



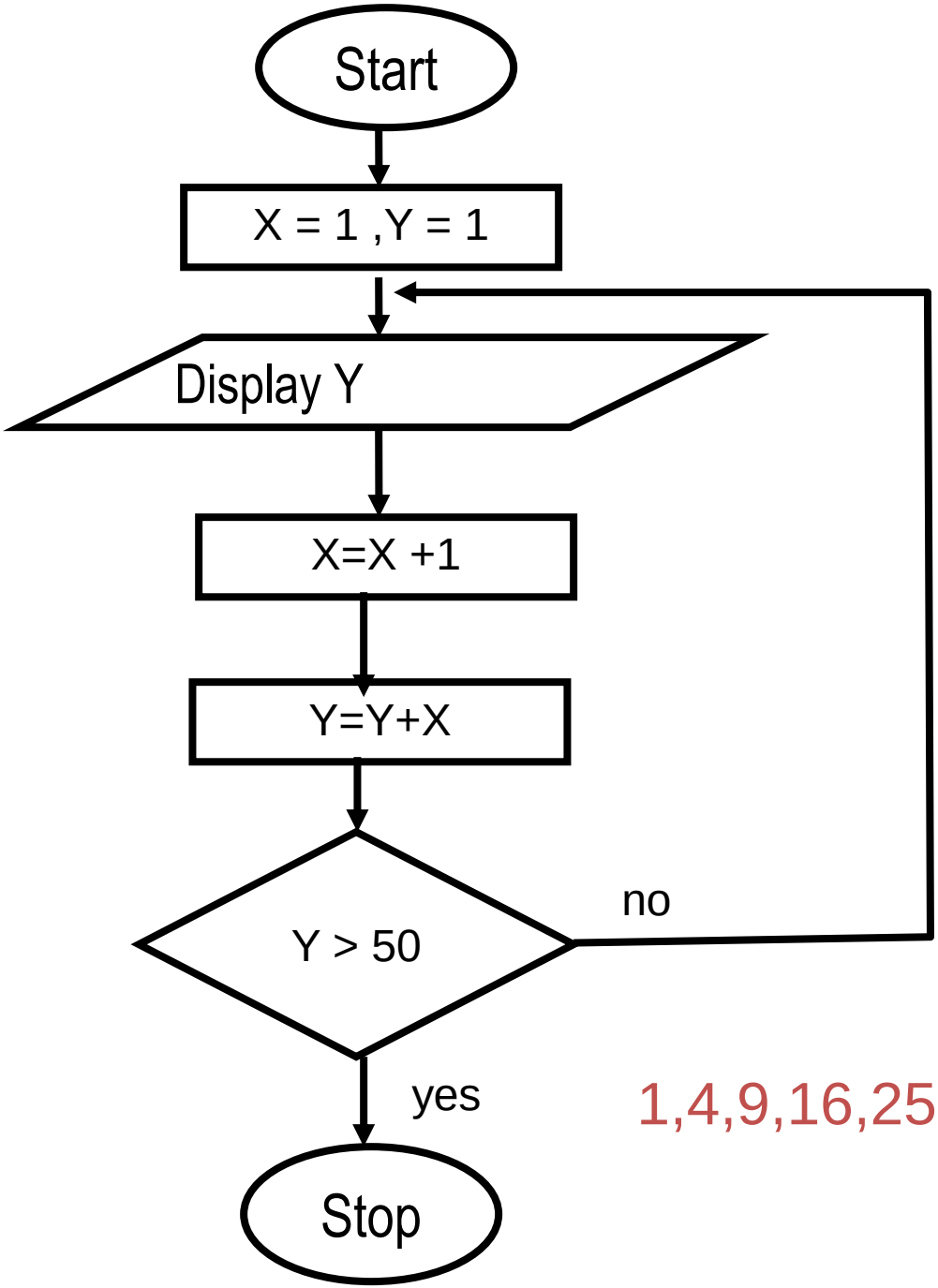
until

Loop



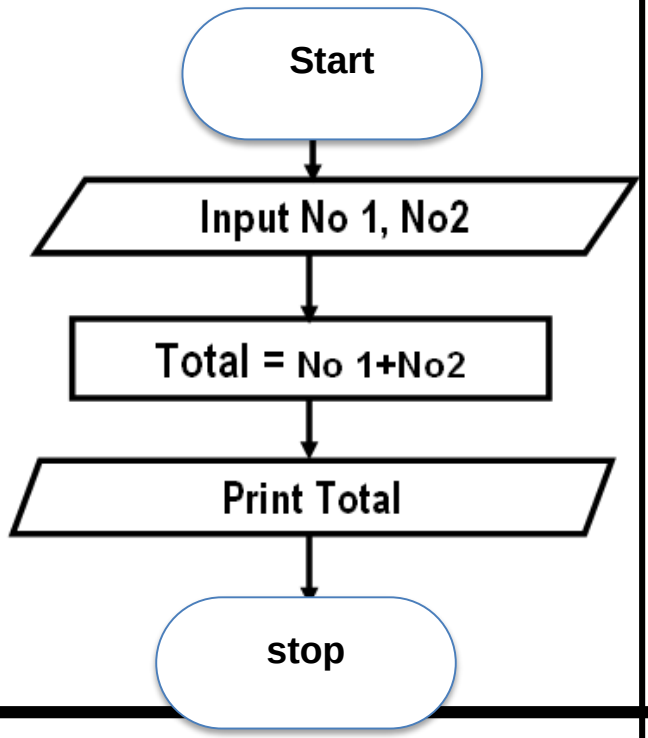

```
Begin
  No=1
    while No <= 10
      Print No
      No = No + 2
      loop
    End while
End
```

No
1
3
5
7
9
11



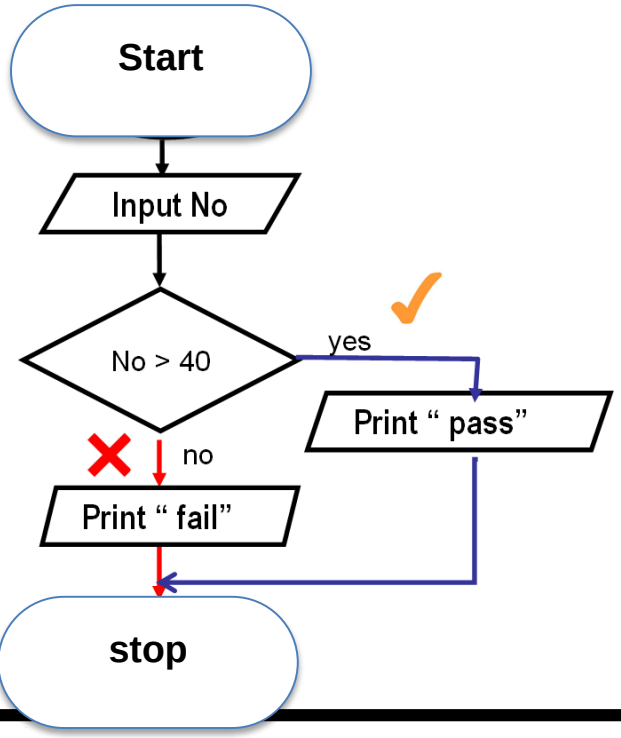
1,4,9,16,25,36,49

අනුක්‍රමය (Sequence)



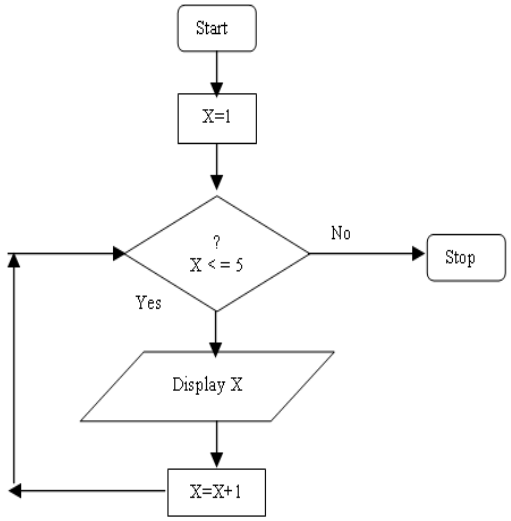

```
Begin
    Input No 1, No2
    Total = No 1+No2
    Print Total
end
```

වරණය - (Selection)

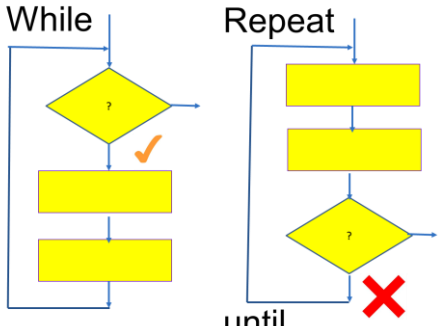



```
Begin
  Input No
    if No >40 then
      print "pass"
    else
      Print "fail"
    end if
End
```

පුනරාවර්තන - (Repititions)

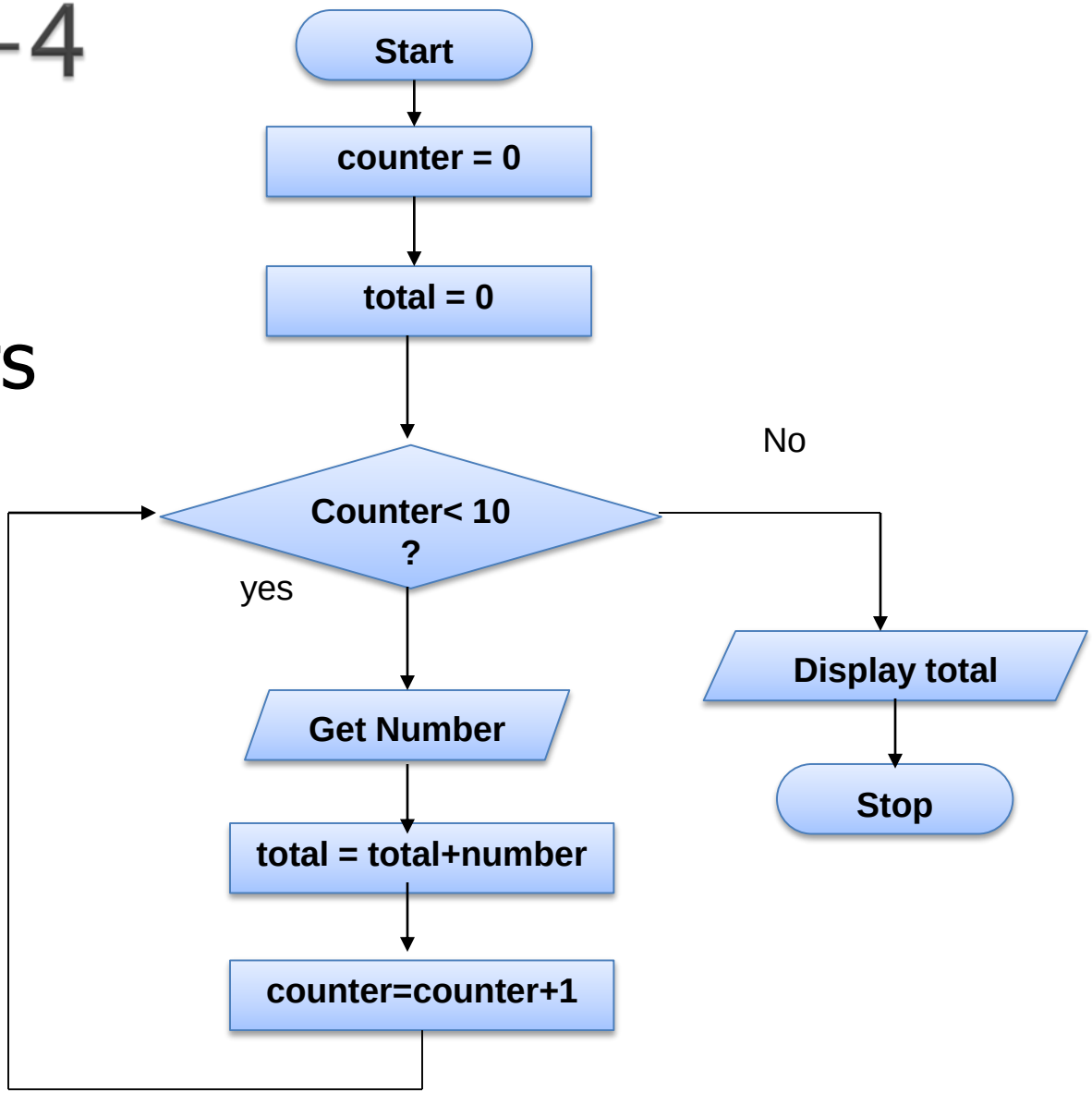



```
Begin
    x=1
    while x<=5
        print x
        x=x+1
        loop
    end while
end
```

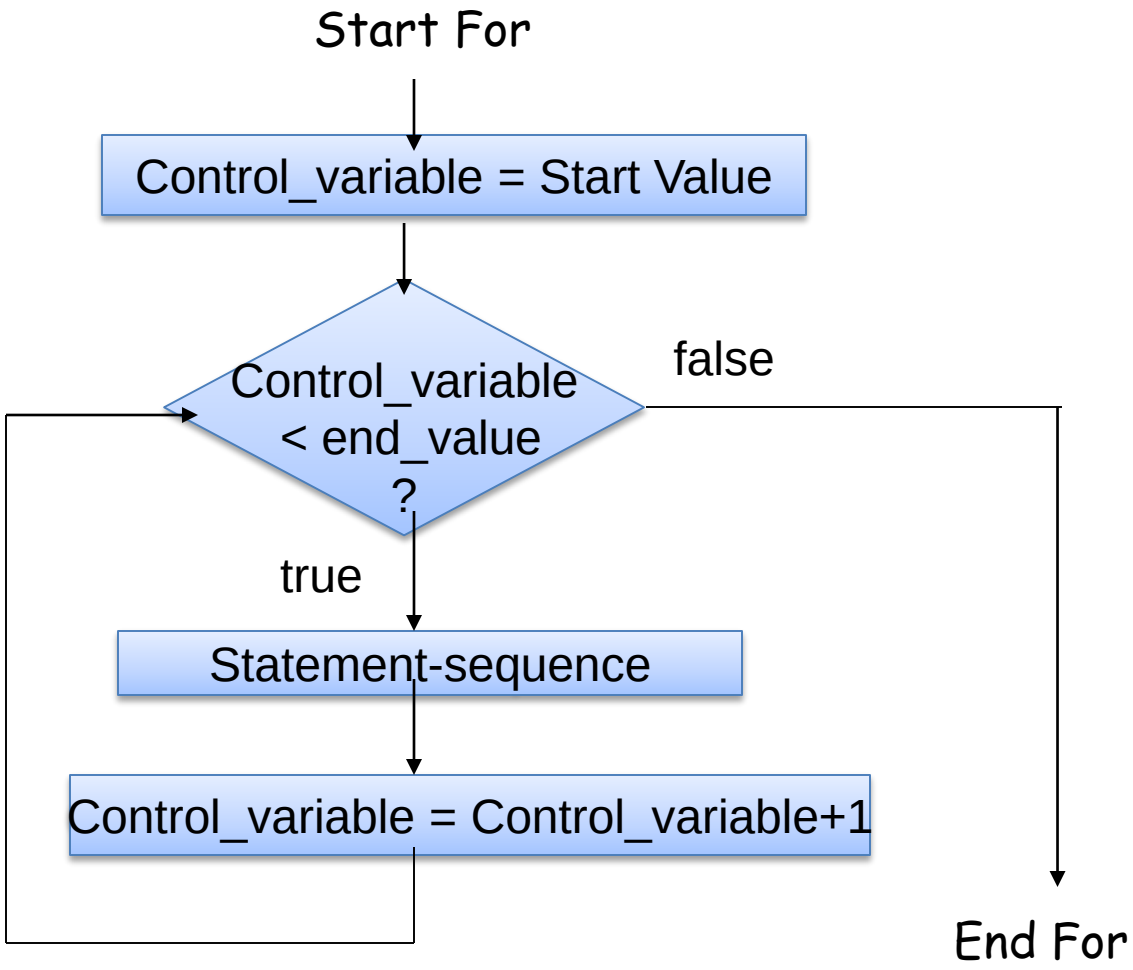


Example-4

- Find the sum of 10 numbers

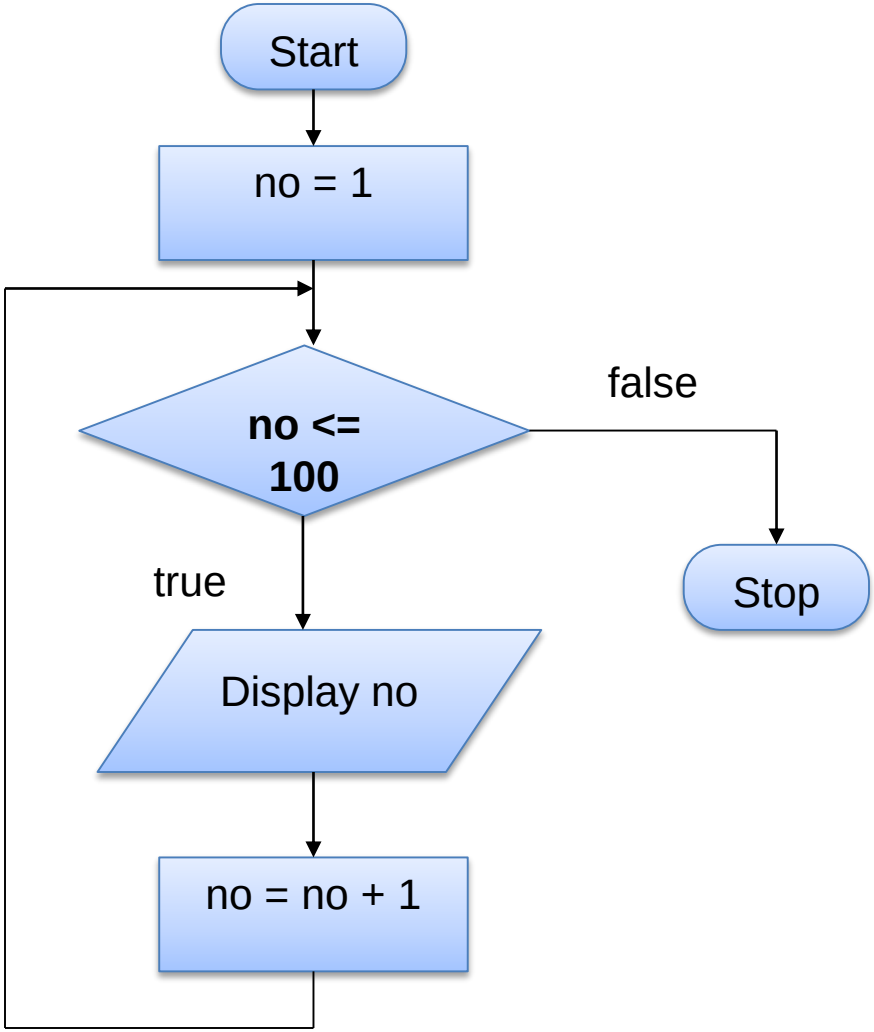


For


Start For
Control_variable = Start Value
Control_variable < end_value ?
false
true
Statement-sequence
Control_variable = Control_variable+1
End For

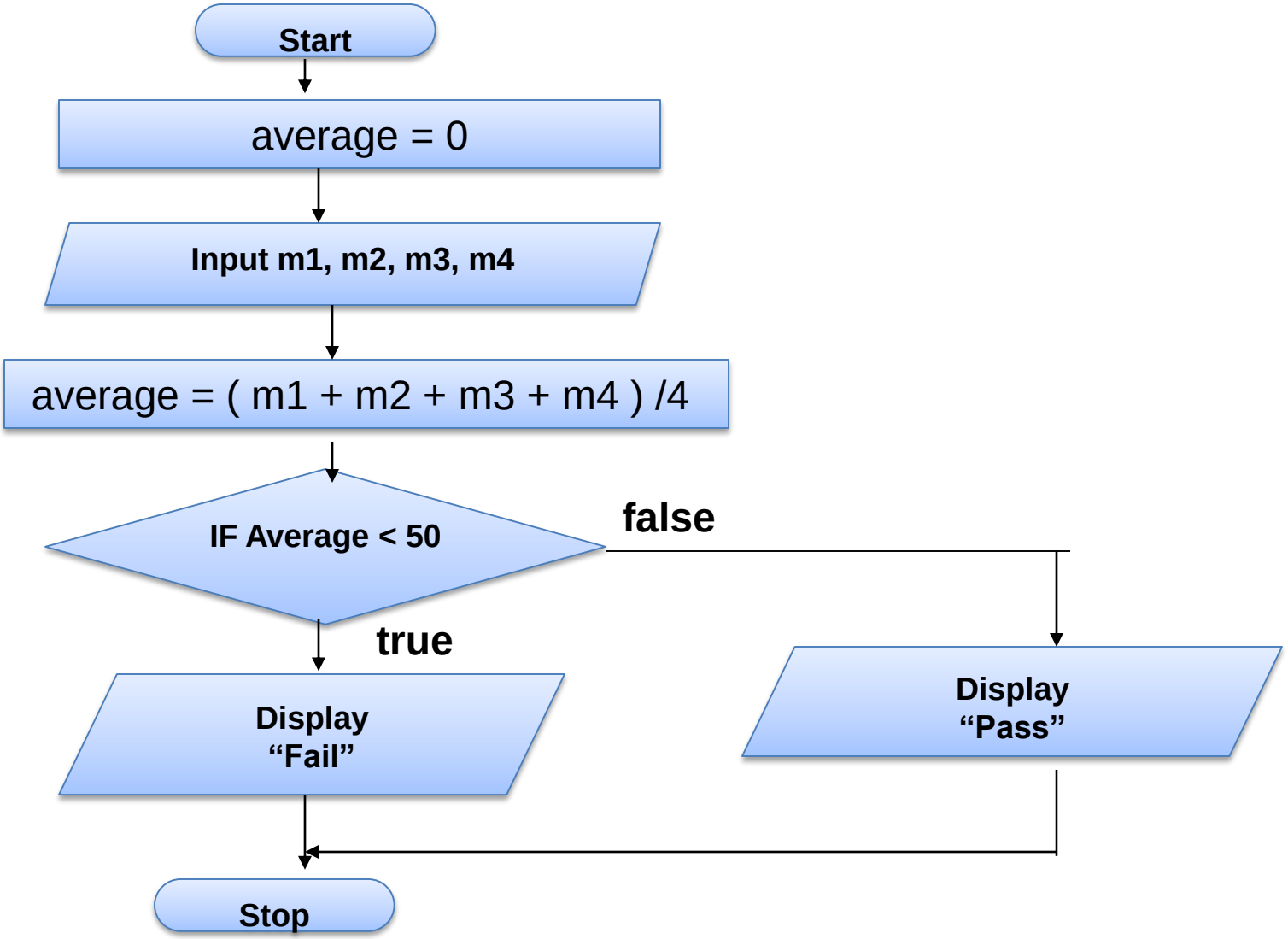
Example-5

Display the numbers 1, 2, 3, 4, 5, ….., 100



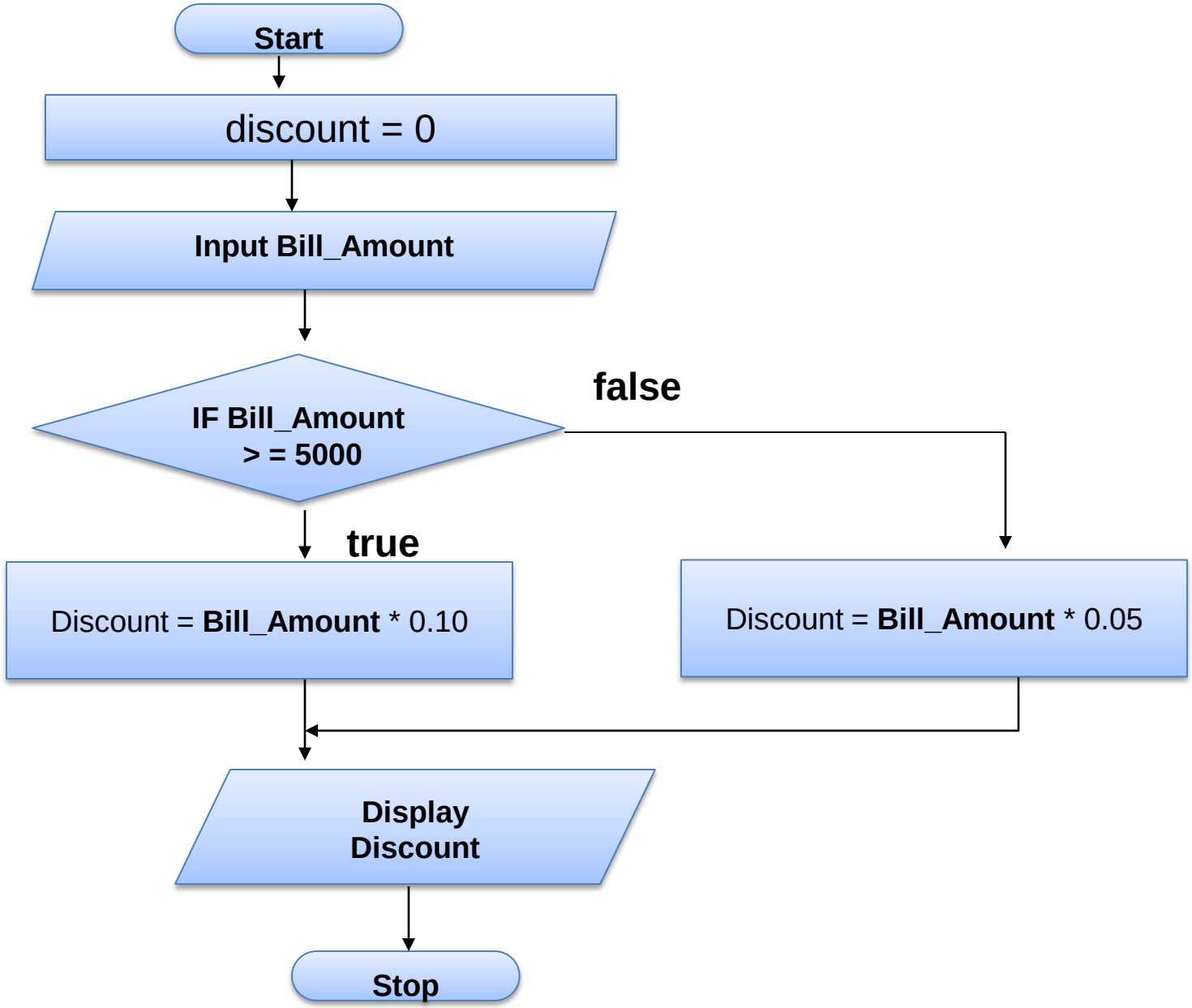
Example -7

- Enter marks of 4 subjects and find the average. If the average is less than 50 then display “pass” else display “fail”.


Start
average = 0
Input m1, m2, m3, m4
average = (m1 + m2 + m3 + m4) /4
IF Average < 50
false
true
Display
“Fail”
Display
“Pass”
Stop

Example -8

- A company gives discounts for the total bill paid by the customers. If the Bill amount is above Rs. 5000/-, a discount of 10 % is given. Otherwise 5% is given. Input the Bill amount and calculate the discount amount.

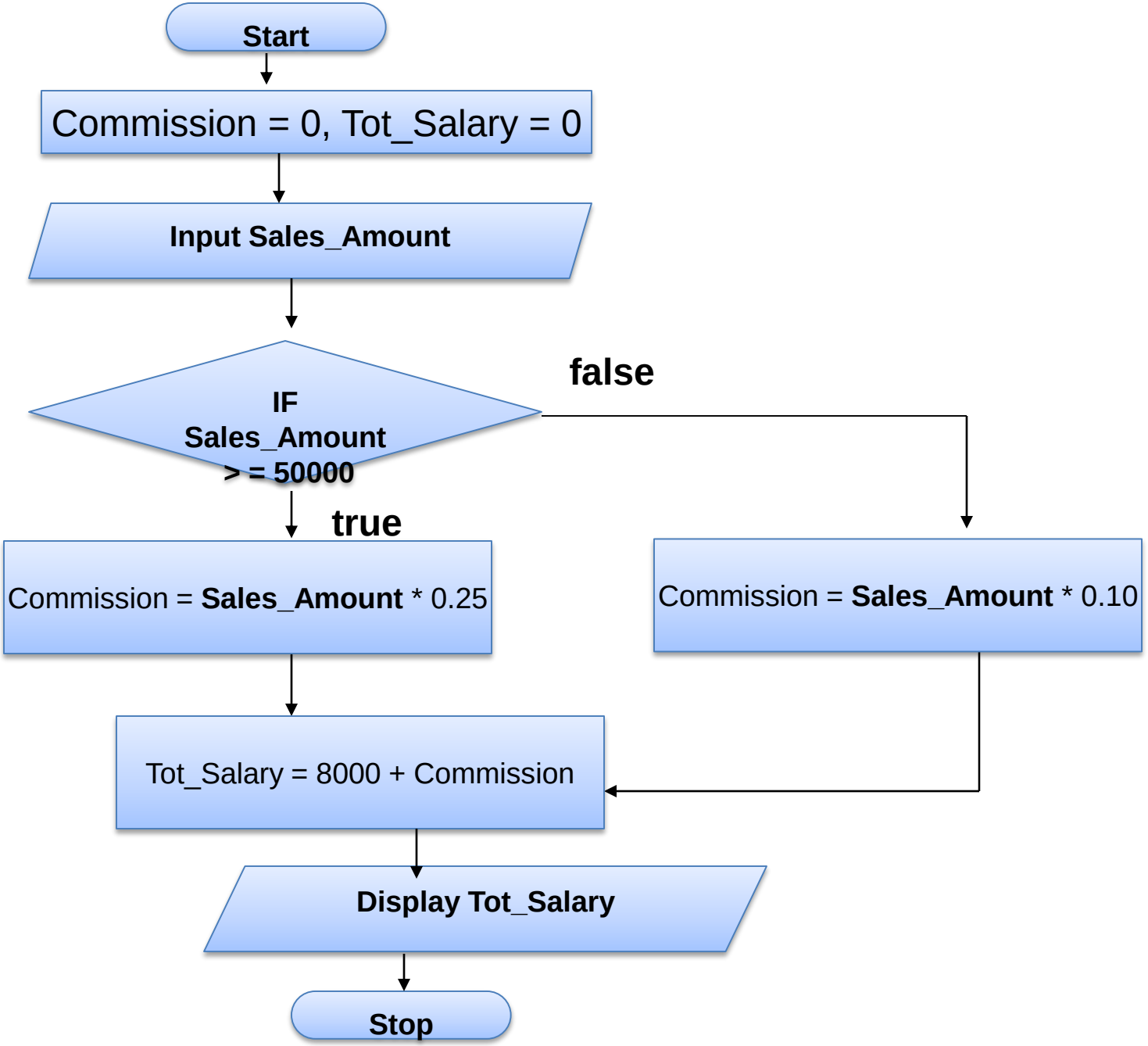

Start
discount = 0
Input Bill_Amount
IF Bill_Amount
> = 5000
false
true
Discount = Bill_Amount * 0.10
Discount = Bill_Amount * 0.05
Display
Discount
Stop

Example - 9

- A company pays a basic salary of

  Rs. 8000/- to the salesmen. If a salesman does sales of Rs. 50,000/- or above, he is given a 25% commission. Otherwise only 10%.

  Input the sales done by a salesman and calculate his salary for the month.


Start
Commission = 0, Tot_Salary = 0
Input Sales_Amount
IF
Sales_Amount
> = 50000
false
true
Commission = Sales_Amount * 0.25
Commission = Sales_Amount * 0.10
Tot_Salary = 8000 + Commission
Display Tot_Salary
Stop

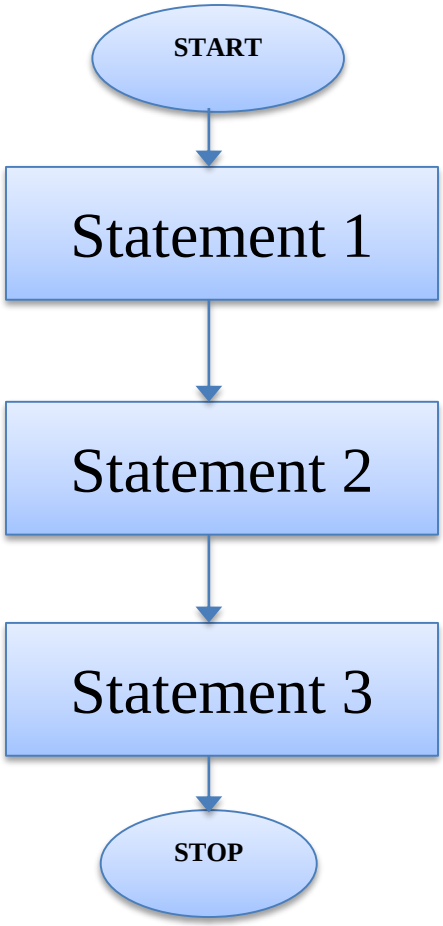
Pseudocodes

- Pseudo codes use every day language...to prepare a brief set of instructions...in the order...in which they will appear in a finished program
- It is an abbreviated version of actual computer code (that's why it is called Pseudocode)
- Once pseudocode is created, it is simple to translate into real programming code.

Control Structures Of a Program

- Sequence
  - Use set of instructions one after the other
- Selection
  - Use IF … THEN … ELSE
- Repetition
  - Use WHILE, FOR, REPEAT…UNTILL

Sequence



Pseudocode;

```
statement 1

statement 2

statement 3
```

Example - 10

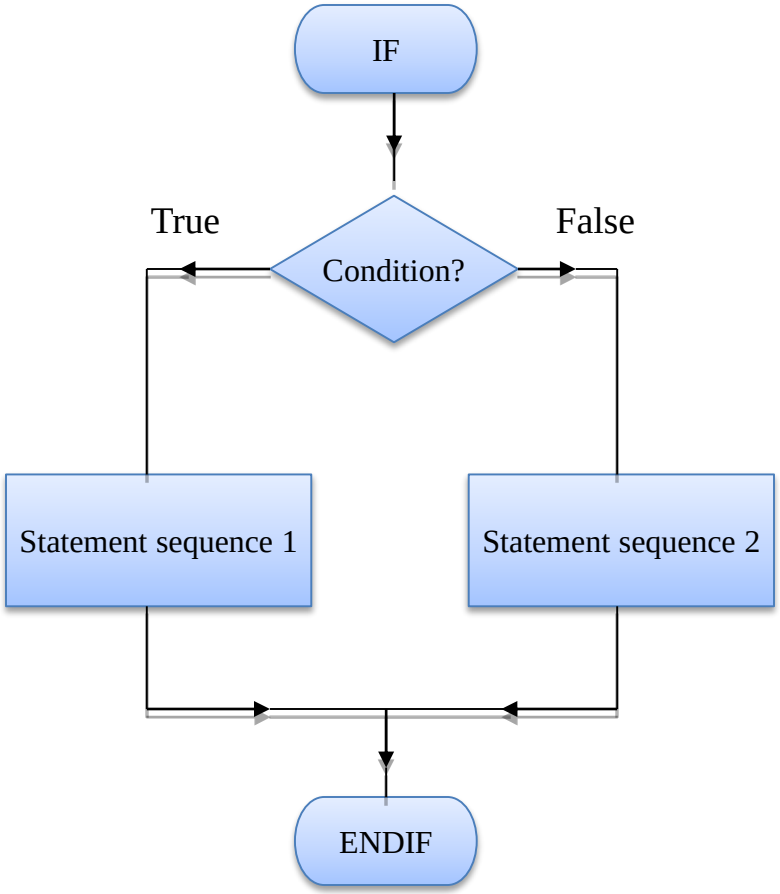
- Write a pseudo code that inputs two numbers (a and b) and calculates the sum of the numbers and output the sum

```
INPUT a
INPUT b
sum = a + b
OUTPUT sum
```

Selection

- ***Compare and Select One of Two Alternative Actions***
- Select one path according to the condition
  - IF …. THEN
    - If the condition is true do the statements inside IF
    - No operation if the condition is false
  - IF …. THEN …. ELSE
    - If the condition is true do the statements inside IF
    - If the condition is false do the statements inside ELSE

Selection



Pseudocode:

```
IF   condition
THEN
     sequence-1(statements)
ELSE
     sequence-2(statements)
ENDIF
```

```
IF <condition> THEN
    sequence 1
ENDIF
```

```
IF <condition> THEN
    sequence 1
ELSE
    sequence 2
ENDIF
```

- *Example1:*

```
IF a>0 THEN
  Print a
END IF
```

- *Example2:*

```
IF a>b THEN
  Print a
ELSE
  Print b
END IF
```

Example-11

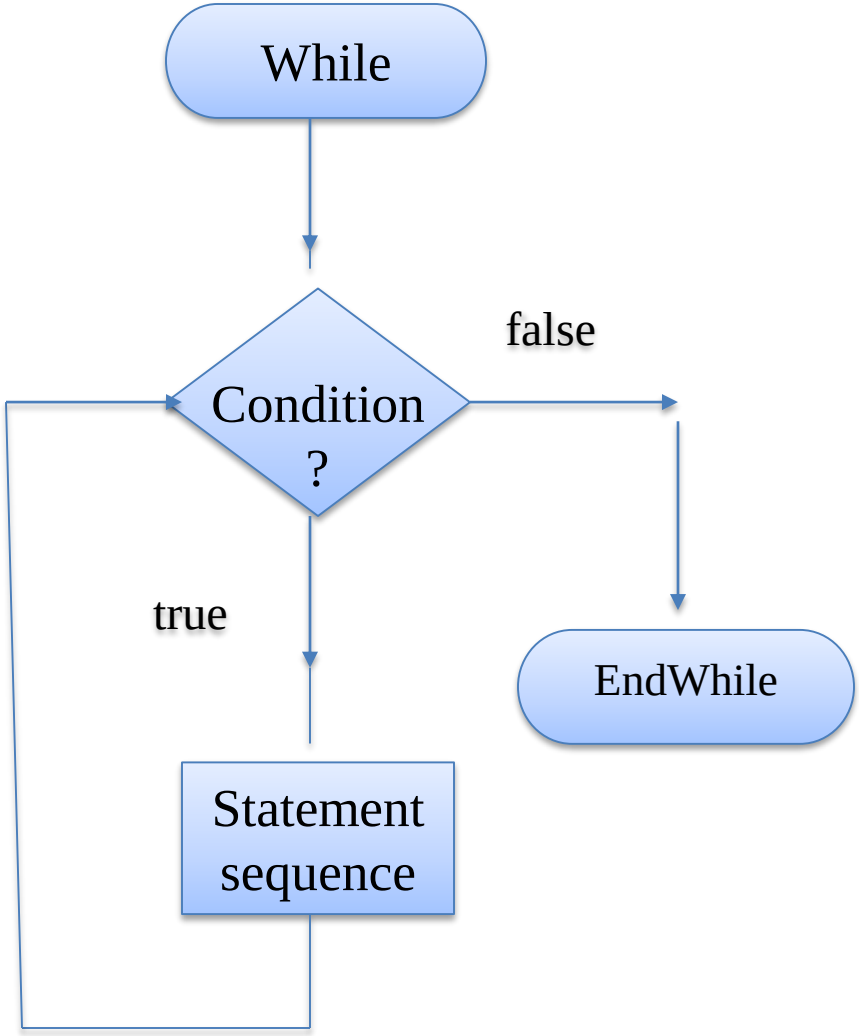
- Write a pseudo code that inputs two numbers (a and b) and output the largest number.

```
INPUT a
INPUT b
IF a < b THEN
        OUTPUT b
ELSE
        OUTPUT a
END IF
```

Repetition

- WHILE … ENDWHILE

While



Pseudocode:

WHILE <Condition>

Statement- Sequence

END WHILE

Example - 12

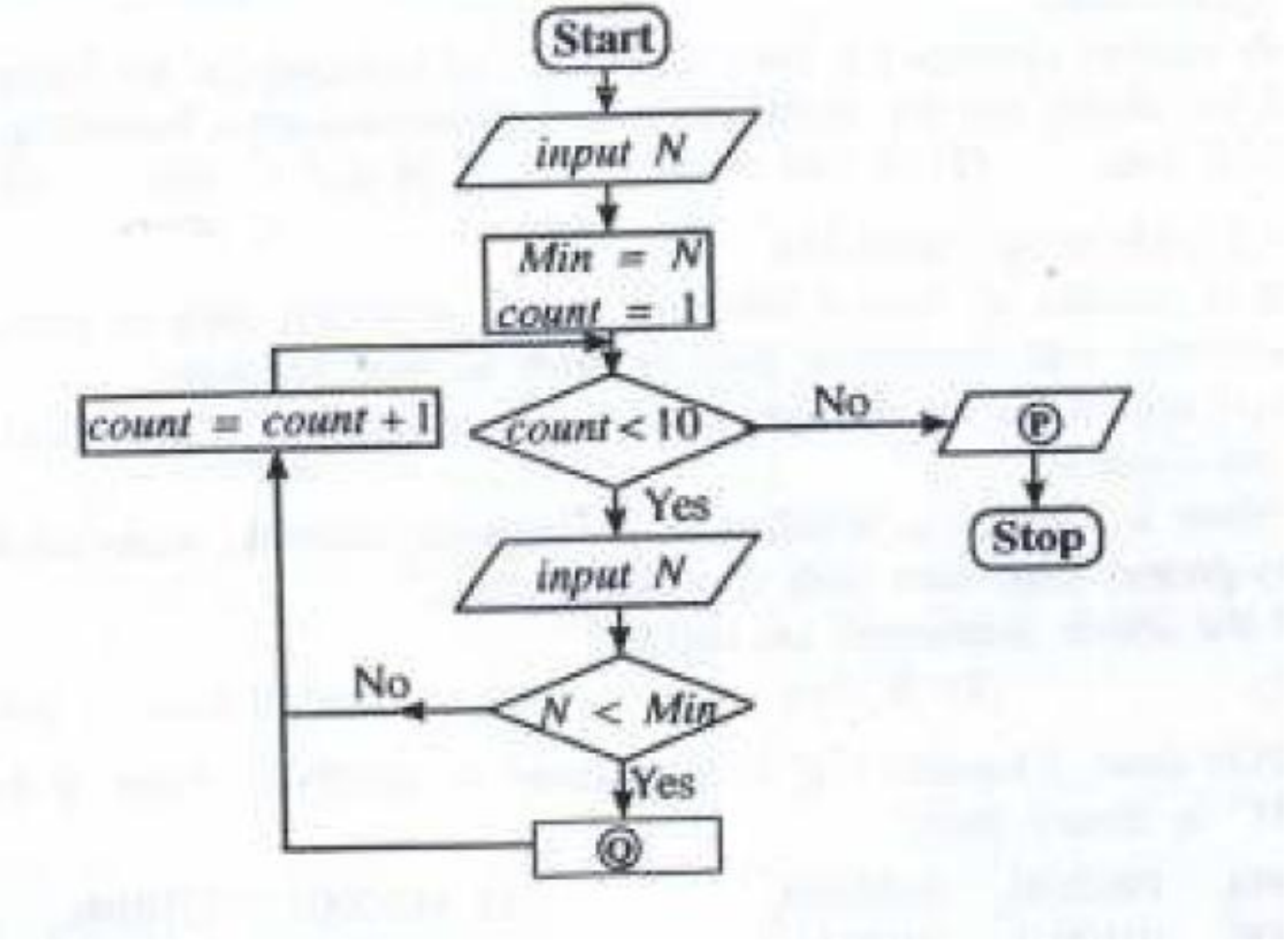
- Inputs 5 numbers and outputs the sum and average of them.

```
count = 1
sum = 0
average =0
WHILE count <= 5 Do
        INPUT num
        sum = sum + num
        count = count + 1
END WHILE
average = sum / 5
DISPLAY sum, average
```

```
Begin
A=8
B=10
If  A=B  then
        A=A+B
Else
        B=B-2
END IF

PRINT A,B
END
```

```
Begin
count=1
While count <=n
        input houseNo,LR,TR
        units=TR-LR
        if units<65 then
                bill=units X  5.00
        else
                bill=(64X 5.00 ) + (units -64 )X 10.00
        end if
      print bill
      count =count +1
End while
End
```


Start
input N
Min = N
count = 1
count = count + 1
count < 10
No
Ⓟ
Stop
Yes
input N
No
N < Min
Yes
Ⓠ

How many times display “HELLO”

Begin

```
count = 0
repeat
   display ("HELLO")
   count = count + 1
until count > 4
while count > 4
   display ("HELLO")
   count = count - 1
end while
```

end

Begin
Input average_marks

```
if average_marks > 50 then
    if failed_subjects = 0 then
        scholarship = 'True'
    end if
end if
```

end

Begin

```
count_A = 1
while count_A <= 10
    count_A = count_A + 2
end while
```

End

Begin

```
count_B = 1
repeat
    count_B = count_B + 2
until count_B <= 10
```

End

Begin

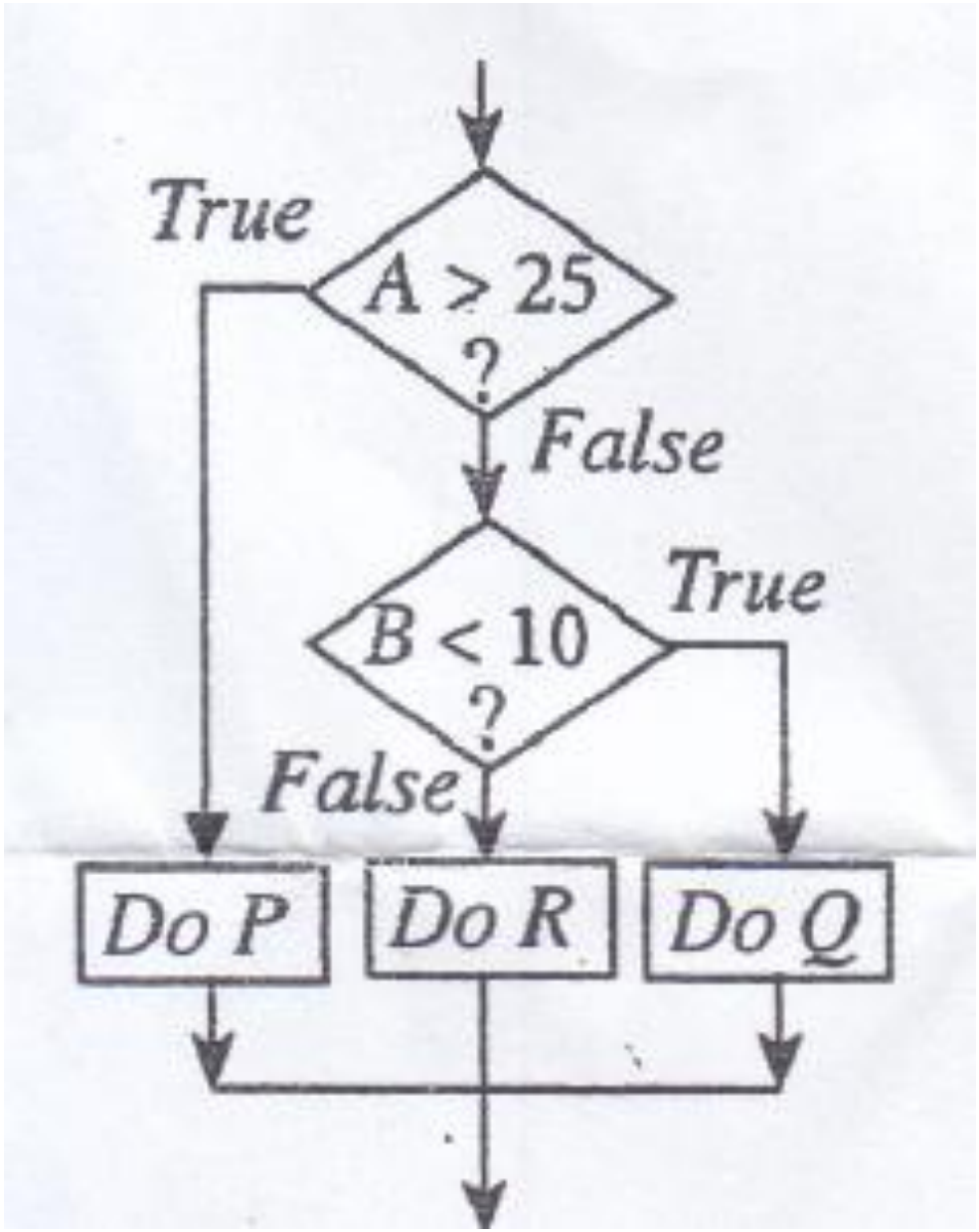
```
OddTotal = 0
count = 0
CurrentOdd = 1
while count <= 3
        OddTotal = OddTotal + CurrentOdd
        CurrentOdd = CurrentOdd + 2
        count = count + 1
end while
print OddTotal
```

End

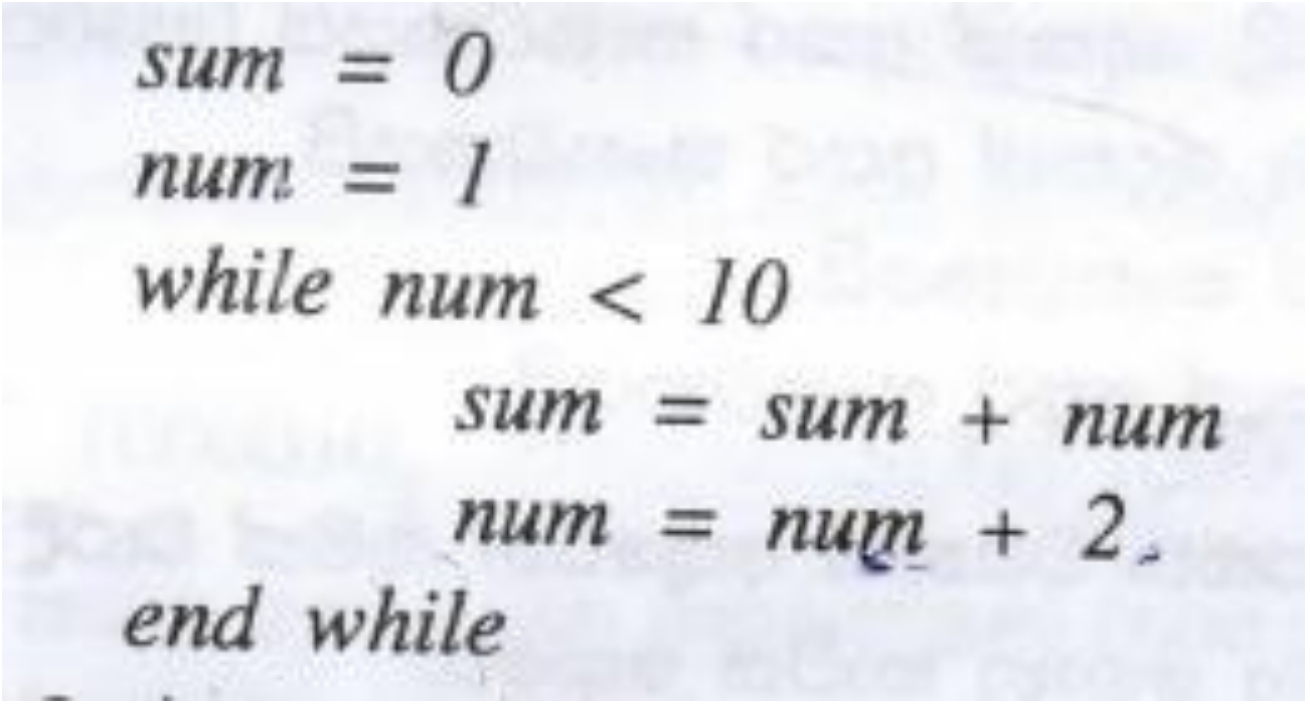
Begin

```
count = 9
while count >= 3
    count = count - 2
end while
```

End


True
A > 25
?
False
True
B < 10
?
False
Do P
Do R
Do Q

begin



```
sum = 0
num = 1
while num < 10
        sum = sum + num
        num = num + 2
end while
```

Print sum, num

end

```
Begin
count=1
max=0
While count <=10
        input no
        if no> max then
                max=no
        else
        end if
        count =count+1
End while
Print max
end
```

```
Count=1,max=0
Input n
While count<=n
      input name ,m1,m2,m3
           avg=(m1+m2+m3)/3
           if max>avg  then
                    max=avg
                     maxname=name
           endif
       count=count+1
 end while
Print maxname,max
end
```

```
Begin
count=1 , tot=o, avg=0
While count <=40
        input m1,m2,m3
        tot=m1+m2+m3
        avg=tot/3
        if avg > = 40 then
                print “Pass”
        else
                print”Fail”
        endif
        count = count +1
End while
End
```